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DENTAL and SURGICAL MICROCOSM.

A Quarterly Scientific Journal.

DEVOTED CHIEFLY TO THE SCIENCE OF

Anæsthesia and Anæsthetics.

VOLS. I AND II.

CONTROLLING EDITOR,

SAMUEL J. HAYES, D. D. S.

ASSISTANT EDITOR,

FREDERICK GAERTNER, A. M., M. D.

PITTSBURGH, PA.,

1892.

Hayes Dental and Surgical Manufacturing Co.

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PREFACE.

The Dental and Surgical Microcosm was conceived to supply a long felt want in the Medical and Dental professions, especially in the Art and Science of Anæsthesia, to which it is chiefly devoted. And as it is the first and only journal, (so far as we know), in the world principally devoted to this important Art and Science, it has received a hearty welcome by both professions, and an unprecedented subscription during its existence. Yet this is nothing more than should be expected. If this Art and Science is but in its *infancy*, and less knowledge of it has been attained than any other connected with the healing Art, and yet, of more importance than any other connected with either profession, as future life and health are concerned; then, should not this journal receive greater favor than any other journal published? This is evidently true, when it is known that The Dental and Surgical Microcosm is pre-eminently a scientific journal, independent, and not only progressive, but aggressive in its character; fearless and uncompromising with error; belonging to no school of either profession, nor "combination" or trust. Its great and chief aim is to develop the much neglected Art and Science of Anæsthesia or hypnotism. With reference to this the Controlling Editor has been selected with special reference to his qualifications for this important work.

Dr. Frederick Gaertner, the eminent scientist and physician of Pittsburg, who has devoted much time and attention to surgery and pathology in their co-operative relation to anæsthesia and anæsthetics, was also selected with reference to his special qualifications for his work.

Doctor Gaertner was principally educated in Germany, England and France. He had occasion to work with some of the most learned men, such as Koch, Virchow, Billroth, Von Langenbeck, Von Recklinghausen, and many others of the old continent. Dr. Gaertner is editor of several other scientific magazines, and has a world-wide, international reputation as a writer, observer and investigator.

The first volume having begun in July, 1891, and the second volume being incomplete at the close of 1892, we have designed by the preface and index that Volumes I and II shall be bound in one book; and that Volume III shall start and end with the calendar year. This important change in date and volume we make for cogent reasons, and at request of many friends and subscribers.

With renewed vigor and greater facilities we enter upon the publication of the third volume in January, 1893, and hope to make The Dental and Surgical Microcosm worthy its name and its important mission.

The Controlling Editor.

Pittsburgh, October, 1892.

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ERROR.

Through an inadvertency of the printer, the second number of volume I was wrongly numbered, and should be renumbered by the binder in compiling the first and second volumes. Should be bound together into one book.

Koch.

M. L. Pasteur

THE
DENTAL & SURGICAL
MICROCOSM.

VOL. 1. JULY, 1891. NO. 1

THE EFFECTS OF ANÆSTHETICS UPON THE HUMAN SYSTEM AS EVIDENCED BY SPECTROSCOPIC OBSERVATIONS.

BY DR. S. A. WATERMAN, OF NEW YORK.*

There is probably no difference of opinion in the medical profession that a perfect anæsthetic, one possessing all the requisite properties to insure rapid action, complete safety and freedom from pernicious after-effects, combined with cheapness and readiness in its preparation, would be one of the greatest boons to suffering humanity.

And I am also certain that there exists no difference of opinion amongst us to-day, that we do not, as yet, possess this boon; that none of the anæsthetics known to us at present possess all these priceless properties, and that, in dealing with these subtle agents, we are, indeed, passing the borderland which separates life from death.

I think it must be conceded that all anæsthetical agents now employed are more or less dangerous to the health and life, and their employment is beset with more or less grave consequences.

In estimating the effects of an anæsthetic upon the human system, its mode of action should be critically known beforehand, not empirically only; we should be able to foretell what the action of a certain agent would be upon a given individual, by closely examining into his physical condition; and we should be fully able to appreciate the pathological states that forbid or modify its exhibition. To this end every rational practitioner is bound to understand the chemical composition of these wonderful agents and, above all, what particular organ or fluid in the human economy is primarily effected by them; and also the precise manner of the changes which take place in the same. Those who imagine that all anæsthetics act upon the animal economy alike, and their peculiar mode of action is the same under all circumstances, have yet to learn that this is far from being the case; that, on the contrary, various agents affect the system in quite different ways.

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*Read at a meeting of the American Dental Convention, The Southern Dental Association and The Dental Society of the State of Maryland, August 16, 1877.

This knowledge, pregnant with the utmost importance, has become almost positive through the agency of the spectroscope. It has supplied the missing link to our chain of reasoning; the shadowy field of theories has been cleared up; the laws governing the relations of anæsthetics in contact with the blood current have been ascertained, and rational progress has been made to insure safe anæsthetics. I have abiding faith in the progress of chemical science, that it will finally point out an agent from the almost inexhaustible material at its command, that will satisfy all ends of surgical requirements; an anæsthetic that, whilst it will annihilate temporarily all sensation, will leave consciousness and vitality intact. We are the more entitled to entertain this hope, as we are already acquainted with some agents that, when locally employed, suspend the sensibility of the parts. Rhigolene is one of them, otherwise known as pentlyn or hydrite of amyl, a light, fragrant fluid, the boiling point of which is 86° F. In the trimethylic ether we possess another remarkable agent of this class. Much of the knowledge we possess on these subjects has been supplied by the English savant, Dr. Richardson. I have clipped the following passage from his report of 1870: "In a previous report on amylene, I pointed out that its vapor, whilst it destroys sensation, does not destroy all conscious acts; and in any later observations on the action of methylic ether, $C_7\ H_{16}\ O_3$ the same facts have been more perfectly elicited. In several cases where I administered this ether for removing pain in surgical operations, the patients, when quite insensible to pain, were so conscious that they were able to obey every request made of them, and in some cases were anxious to reason, stating that they knew what was going on, and arguing that they were not ready for the operation because they were sure they would feel pain. Nevertheless in this state of mental activity, they were operated on, and afterwards, while remembering every incident, were firm in their assertion that they felt no pain whatever during the operation. One patient, who sat for the extraction of two teeth, selected the tooth to be first extracted, putting her finger on it, and afterwards rearranging her position for the second removal. To the looker-on it seemed, in fact, as though no change in her life had occurred, yet she affirmed that she was sensible of no pain whatever; and several other less striking, but hardly less singular examples, come before me."

We may then, I think, fairly assume that in course of time we shall discover manageable and certain anæsthetic substances which will paralyze sensation only, leaving the muscular power unaltered, and the mental little disturbed; and we gather from this that either in the cerebral hemisphere there is some distinct and simple center of common sensation, which may be acted upon by certain agents without involving all the cerebral mass, or that the peripheral nervous matter may be influenced without involving those portions of the nervous system. What Dr. Richardson here says is of the utmost importance on the subject before us. There may be cases where it may be useful, nay necessary, to suspend consciousness also, and we should be able to graduate our agent in a manner so as to push onward, to any desirable degree, without endangering the life of our patients. Those who desire to learn more of this subject are referred to Dr. Richardson's most able and exhaustive report; and also to the highly interesting and admirable lecture by Prof. B. Sillinan, Jr., of Yale, delivered to the medical class in Yale College, September 14, 1871, and afterwards printed in pamphlet form, and in the *American Journal of Science and Art*.

I have already referred to the spectroscope, and told you that the spectral analytical test gives us most valuable information on the subject before us. I propose now to make this assertion good. There may be many amongst my kind hearers that know all about the spectroscope and the work it can do and has done for chemistry, and celestial and terrestrial physics. Others, perhaps, may have given the subject less attention. For the benefit of all, and in order to give a clear and satisfactory view, I shall speak as if this interesting subject were entirely new to you.

And in the first place what is meant by the term "spectral analysis?" It is a scientific process in which solar or artificial light is employed, in connection with a series of prisms to analyze organic as well as inorganic substances. The instrument employed for this purpose is called a spectroscope, and when connected to a microscope we call it a micro-spectroscope. It consists of a number of prisms within telescopic tubes, and a slit arrangement so as to regulate the admission of light, and one or more collinator lenses to gather the rays and make them parallel. Through the movable slit the light enters and passes through the prism or prisms, and through one of the telescopic tubes the colored image or spectrum passes into the observer's eye, and is appreciated by the retina. This image may also be thrown upon a white screen, a method that I would gladly resort to, had I possession of the necessary screen arrangements. You all know what happens when a ray of light passes through a prism. It is decomposed into its ultimate constituent colored tints, forming a beautiful band, called a spectrum. It contains all the colors of the rainbow, in regular succession of tints, from red to orange, yellow, green, blue and violet. We witness, also, other interesting changes. When white light passes through a prism, the emerging rays are seen to have been bent out of their course. They spread fan-like to the left and to the right. They are dispersed and we call it the refraction of the rays. The violet part of the spectrum is greatly more bent out of its course than the red part, which is less refrangible. This deflection and greater refrangibility of the violet rays depends upon the constitution and nature of light itself, whose waves are propagated through space by a subtle fluid known as the "luminiferous ether," which fills the illimitable space and permeates every atom of matter. These ethereal waves differ in length. The longest from the extreme red part of the visible spectrum; the shortest, those of the extreme violet. According to Tyndal, the length of an ethereal wave of the extreme red would require 36,918 placed end to end to cover one inch, whilst the extreme violet, 64,631 to the inch. As the sun's light comes to us from a distance of 90,000,000 of milles, we can perceive the amazing number of waves and their inconceivable velocity, considering that these waves reach us in the short time of 8½ minutes. The number of ether impulses necessary to produce upon our retina the impression of red light is, therefore, 451,000,000,000 per second, and in order to produce the impression of extreme violet, 789,000,000,000 are required. Impulses above as well as below these numbers fail to make any impression upon our retina. This is indeed a captivating chapter of physics, but I am admonished that my subject lies in a different direction to which I am in duty bound to return.

When the light we employ for analytical purposes, is artificial, say the flame of an oil or petroleum lamp, or the magnesium or electric arc light, we see the tints pass imperceptibly, one into the other, and we have what is called an uninterrupted spectrum. When, however, sunlight is used or the light from any planet that reflects the solar light, say the light of the moon, we find that the spectral band is traversed by thousands of fine lines, some darker and broader than others. Such a spectrum is called an interrupted or solar spectrum. The inquiry into the cause of these solar lines is full of interest, but I have neither time nor space to enter fully into its consideration. These captivating features of spectral analysis are applicable to solar and celestial physics, but are not absolutely necessary to the intense logical inquiry before us. The lines which traverse the solar spectrum are constant and never change position. They have been mapped by Thalen and Angstroem and Kirchoff. Rutherford, of New York, has photographed a portion of them from the sun itself. Fraunhofer employed the most prominent of these lines for purposes of measurement as far back as 1814. He selected nine lines in various parts of the spectrum, A, B, C, D, E, F, G and H ; and these lines are known the world over as Fraunhofer's lines. You will understand by-and-by how useful these lines are in spectral analysis. These nine lines, and in fact every one of the thousands of lines that traverse the spectrum, represent some terrestrial substance in a vaporous condition in the sun, and we learn from these hieroglyphic lines that the sun, the stars, the comets and the nebulæ, the aurora borealis and the zodiacal light, which, according to the latest view, encircles our earth as Saturn is encircled by a triple set of rings. That, in short, all celestial bodies, without exception, contain substances or elements which we meet on our earth, thus becoming witness to the unity of the universe.

The D line is produced by burning sodium ; the lines C, F and G are peculiar to burning hydrogen gas ; the E line is one of the most prominent iron lines ; the line C is produced by the vapors of magnesium, and the H line is characteristic of volatilized calcium.

In our inquiries these lines serve us as landmarks to register the position of bright lines and absorption bands. Scales, graduated into tens and hundreds of degrees, are also employed and placed above the spectra, dividing the color regions.

The process of making an analysis by means of the spectroscope is simple, indeed. Bodies to be examined are either solids, liquids or gases. The solids are volatilized by means of heat. To this end we employ a Bunsen's burner, the electric arc or the compound oxygen flame. Fluids are placed before the slit of the spectroscope in suitable glass vessels, with plane parallel walls. When the rays of the light pass through colored solutions, ere they impinge upon the prism, various tints are absorbed. We observe a variety of dark bands, varying in shades, in numbers and in position, in the spectral regions. There are no two substances at present known that give absolutely the same bands. Gases are examined by means of tubes devised by Pfluecker and Geisler, and known as Geisler's tubes. They are made of various sizes and shapes, some quite fanciful. They consist of thin thermometer tubes with a bulb at each extremity, into which electrodes of platinum or aluminum are soldered. Electrodes of other metals would oxidize in the extreme heat generated. The tubes are filled with the gas we wish to experiment upon ; the air pump is then applied until the 1-600 or 1-700 part of the ordinary atmospheric pressure is left. Then we pass an electric spark through the attenuated gas, which in this condition no longer resists the passage of the spark ; intense heat is generated and brilliant and beautiful lights emitted of various colors, changing, of course, with the different gases employed. Being able then to master the solids, fluids and gases, no known substance can escape the analytical power of the spectroscope. Every known substance modifies the spectrum in a manner specific or peculiar to itself. Some substances give only bright lines—for example, the glowing gases ; others give dark lines and absorption bands ; some absorb all the colors of the spectrum with the exception of a single bright line. Observe, in the sub-joined diagram, the spectra of sodium and thallium. Others give a spectrum of many bright lines. Compare the spectra of borium, cæsium and rubidum.

It does seem, at first sight, that the immense variety of lines and bands would lead us into inextricable confusion. A little practice will dispel this illusion, however. We soon become familiar with these landmarks. The variety of the spectra, the relative position of the bands and lines, their peculiar forms and outlines, differences in brightness, depth of shading of bands, and their number, in each instance, are characteristic enough to insure ready recognition, even by persons not accustomed to work with the spectroscope.

DELICACY OF THE SPECTRUM OR PRISMATIC TEST.

Let me say a few words regarding the extraordinary delicacy of the spectrum test, which far surpasses any other test known to us. The following example is supplied by Dr. Schellin :

"Let us divide one pound of common table salt, the sodium chloride into 500,000 equal parts. One of these minute dust particles is called a millegram. The experienced chemist is able to weigh such a minute particle only with the most delicate scales, and with extraordinary care and acquired dexterity, but with this performance he has arrived at the limit of possibilities. And now ask the chemist to divide this millegram into 3,000,000 equal parts, and he will shrink appalled from the performance of this impossible task. The human mind cannot conceive of an object so exceedingly minute. Yet we can demonstrate the presence of such an infinitesimally small quantity of sodium chloride by the spectral test. You know that this salt is ever present in nature in extremely fine division. Its never-failing source is the sea ; fine particles of it are supplied to the air by the action of winds and storms and by the slower process of evaporation, thus supplying one of the most absolutely necessary elements to life in its manifold forms and conditions, and furnishing one of the most powerful antiseptics, whereby contamination of air, earth and water is prevented.

The dusting or slapping together of a dusty book in the remotest corner of this hall will immediately produce a yellow flash in a burning candie or gas flame at this end, which, when examined with the spectroscope, will show most distinctly the yellow line in D, and which, as you have already been informed, is the sodium line.

There is another very peculiar and highly useful characteristic of the prismatic test to which I desire to direct your attention. You can examine a number of spectra at one and the same time, that is, you can analyze a number of substances at the same time.

Take, for instance, the ash, obtained from the incineration of human or animal tissues. The hydrochlorate solution of this ash gives a splendid spectrum, the field of which shows many red, yellow, green and blue lines in various regions of a dark spectral ground. By careful comparison we find that these lines belong to six metals, to wit: potassium, sodium, lithium, rubidium, cæsium and calcium. We can give another striking example. The ashed end of a cigar, moistened with hydrochloric acid and held in the flame of a Bunsen's burner, yields the lines of sodium, potassium, lithium, cæsium, rubidium and calcium.

Four new metals were discovered by means of the spectroscope, of very great interest to science, which would otherwise most probably have never been known to us. Brunsen and Kirchoff discovered in the waters of Durckheim, cæsium and rubidium. In boiling down 40 tons of its mineral waters, they found 200 grains of the mixed salts of the above metals, and by the marvelous analytical powers of the spectroscope, identified these substances (1860). Since then these metals have been found in many other localities, especially rubidium, to which many of the most celebrated springs in Europe owe part of their curative powers. Thallium, a most important metal, was discovered by Crook in 1861, in some of the iron pyrites and in a seleniferous deposit from a sulphuric acid factory at Telkerode, in the Hartz (Roscoe). Reich and Richter discovered, in the same way, the metal indium (1864), on account of its spectrum, two indigo blue lines.

You may rightly conjecture that an instrument possessing such wonderful analytical powers, must have found application in manufacturers, arts and sciences; its influences upon celestial chemistry is simply stupendous. It has completely revolutionized our views in this direction. A comparison of the dark lines of the sun and its planets with those of Sirius and other fixed stars, shows us that the same substances known to us are present in all these. Differently arranged as those lines are in different stars, many of them are sufficiently coincident to establish their identity.

When we come to examine the irresolvable nebulous mass, we obtain no longer dark lines, but bright lines only; and we learn thereby that these bodies consist of burning gases, principally hydrogen, which is also so abundant in the sun, where, during the fire storms raging there, it is carried up with explosive force many hundred thousand miles, in the shape of fiery columns. As we come down to the still lower grade of cosmic evolution to the nebulous mass, even these bright lines diminish in number until but a few of them remain visible. One line in F seems to be always present ; the line is nearly coincident with hydrogen line ; another seems to indicate the presence of nitrogen, and still another has not as yet been identified. In the comets all the bright lines have disappeared. Faintly illuminated spots mark the place where, in ages to come, bright lines will appear. These spots correspond to the spectrum of carbon, and in one of these comet worlds may weigh only a few hundred pounds, and may not contain more solid matter than can be stowed in one's hat.

In time to come, when the comets' cosmic dust will have been contracted and condensed, and heat and light will have been evolved, bright lines will mark its progress, and in due time again, as condensation progresses, dark lines, such as we now observe in the spectrum of our own sun, in the spectrum of Sirius and that of a host of other stars, will become visible, and in many, many million years, perhaps, when our own sun system shall have become old and frigid, and its light and heat shall have been dimmed and exhausted, and life has become extinct in consequence thereof, the host of nebulous bodies, now in progress of being born, will assume all the brightness of our present sun and light up the chaos consequent upon the disappearance of our present sun system.

I have scarcely any time left to point out the use of the spectroscope in the arts and manufacture. You must be satisfied with one example. You have heard of Bessemer steel. Steel differs from cast iron in containing less carbon. In the Bessemer process, carbon and silicon are burned out by oxygen contained in a blast of atmospheric air, which is thrown through the mass of molten iron. Formerly the manufacture of Bessemer steel was surrounded by great difficulty, for it is necessary to recognize the exact moment when all carbon is burned out of the iron. When this exact moment has arrived, the operation must be stopped instantly ; ten seconds, more or less, will destroy the entire cast. The spectroscope shows this exact moment when the process is finished, and makes the manufacture of Bessemer steel at once an easy and successful task.

You perceive, gentlemen, I have guided you gradually up the hill from which your views will become clearer and fuller. And here comes the first great lesson in the administration of anæsthetics : that suffocation will rapidly ensue where anæsthetics are used, which cannot sustain respiration, or which is still worse, abstract what supply of oxygen the blood has stored up, unless a sufficient supply of atmospheric air is permitted to be inhaled to sustain life at the same time.

When we examine spectroscopically the blood of chlorotic persons, or that of persons of severe hemorrhages, or who suffer from pernicious anæmia, Bright's disease, fatty degeneration of the heart, or the blood in persons whom disease has reduced the crystalizable coloring pigmet of the blood, as is the case after cholera, typhoid and other diseases, we find the bands paler and know at once that the normal amount of oxygen is wanting in such individuals. Here, then, comes in our second great lesson. In all cases one inquiry should be made into the history of the person who is to be placed under the influence of anæsthetics, and if it is found that any of the diseases enumerated above have been present, and that the hæmato crystalline has been reduced by disintegration and retrogressive processes, leaving your patient with pallid countenance and defective heart's action, be on your guard, for what remains of the vitalized blood may not be able to resist the effect which your anæsthetic is apt to produce, because in these couditions every anæsthetic agent is dangerous.

NITROUS OXIDE GAS.

Let us begin with this gas, the so-called laughing gas, the one so extensively used by dentists, and by many considered a serviceable and harmless agent.

Now let us logically apply all these ascertained facts to our case in hand, in order to learn how this gas produces its effects upon the economy. It deprives the blood of its oxygen and enters into a close combination with its crystalizable material ; so bound, it disables this latter to absorb oxygen from the air or to supply it to the oxidizable tissues of the economy.

In Prayer's experiments we have seen that the dogs, when permitted to inhale oxygen at the highest stage of the dispnœa, they become rapidly as well as ever. Not so after the inhalation of nitrous oxide gas. A certain effect upon the blood has taken place ; often unimportant and transient ; at other times more permanent and grave, sufficient at times to endanger life itself.

Thus we are forced to acknowledge that the application of this gas is far from being safe and harmless; that on the contrary it is pregnant with grave consequences. These facts ruthlessly destroy the infatuation that the inhalation of nitrous oxide gas is a harmless process; a process which any man, educated or not educated, may carry on without danger of destroying life. The recent death which occurred at Exeter, on the afternoon of January 22d, of this year, furnishes a lesson not to be forgotten. The gas was administered by Dr. F. F. Mason, for the purpose of the painless extraction of a large upper molar tooth. The lady, Miss Wyndham, was about 38 years of age, in good health. Her physician, Dr. Pattison, was present. Gas from the same source had been administered to other patients, so that its quality could not be impugned. She took the gas in the usual way, without any symptoms to excite uneasiness. At the proper degree of insensibility the gas was stopped and the tooth extracted. It was not until after the operation was completed that anything unusual happened. Her face suddenly became livid and the features began to swell, and she seemed to be quite unconscious. She breathed two or three times and in a few moments her pulse ceased to beat. All attempts to restore her were fruitless. There was no obstruction to the air passages, and the tongue was protruded while she still respired. "From no agent has there been so many hair breadth escapes from death as from this gas, and probably of late some persons every day have been brought within the minutest line of danger to which Miss Wyndham succumbed."

We learn the most important lesson that we have a great deal to learn before we shall have perfected anæsthetic agents. Toward such learning the reintroduction of nitrous oxide gas has been a serious check. Nitrous oxide gas is indeed not a true anæsthetic at all. A true anæsthetic is an agent that suspends common sensibility without, by any necessity, interfering with those organic processes on the continuance of which life depends. Nitrous oxide gas acts by suspending one of the most important organic processes, that of respiration. The insensibility produced by this gas is afforded during an interval of partial death. This interval, doubtful, transient, dangerous, may allow less time for a short operation, and suspending the inhalation the function may return, but that it may never return the above case furnishes a lamentable proof.

"No intelligent observer, who ever witnessed the ghastly, cyanosed appearance of persons who have inhaled this gas until its anæsthetic effects are produced, will deny that the ensemble of symptoms betokens a powerful influence upon the blood mass which continues for many hours and days. I have seen some cases where the inhalation of this gas was followed by pulmonary, and cardiac diseases and death. The profession at large may yet learn to modify its opinion regarding its freedom from danger after its application."

You may remind me that in a dental institution, in New York, we are shown a gigantic roll, containing the names of many thousands who have inhaled this gas there, so far, without any direct fatal effect. But how is it with after effects? The institution referred to keeps no record of what becomes of its patients afterwards. One of my fatal cases—dying from after effects—had inhaled the gas there three or four months previous. She was a perfectly healthy woman before the inhalation, and her disease began right after it. Other well authenticated cases are not wanting to prove, that nervous disorders of many kinds and a train of organic diseases follow its exhibition. Dr. Frank Hamilton, of New York, attended a case of incurable epilepsy, directly produced by the inhalation of this gas. Dr. F. R. Thomas, in his treatise on nitrous oxide gas, says: "It resembles strongly in its effect an attack of congestive apoplexy. Many are deprived of sleep long afterwards, and complain of unremitting headaches; nor are instances rare where, after its use, vertigo, syncope, melancholy, insomnia, convulsions, hysteria and irregular heart's action, could be attributed directly to its use.

CHLOROFORM.

The main disadvantage of chloroform is its high boiling point, requiring a great amount of vital force to eliminate it from the body, so that it is probably never eliminated entirely by the lungs, but only with the aid of all excreting organs, any deficiency or derangement of which may consequently lead to such suppression of elimination that the nervous system may be overwhelmed with consequent arrest of their activity.

It is but fair to state that here, also, is a great deal to learn of the mode in which chloroform spends its force in the living economy. The warning given when I spoke of nitrous oxide gas, regarding the danger to give this agent to debilitated persons, or to those laboring under organic disease and impoverished conditions of the blood, must find a still more grave consideration here. I found, very frequently, sugar in the urine after the inhalation of of chloroform.

Prof. Silliman thinks the best treatment in impending death from chloroform, is the introduction of air into the lungs by artificial respiration—heated to 130° F. by means of bellows.

DEATHS FROM ANÆSTHETICS IN 1877.

We have recorded in our columns during the present year, fourteen cases of deaths under anæsthetics. Ten of these deaths were from chloroform, one from ether and nitrous oxide gas, one from methylene and ether, and one from nitrous oxide gas, and one from ether and carbonic acid gas. The patient in the latter case (a man 69 years of age, suffering from peritonitis), having for about thirty seconds inspired only his expired air.

DEATHS FROM NITROUS OXIDE.

A death from nitrous oxide is reported from Montreal. A man, aged 24, went to the office of a dentist to have a tooth extracted, and requested to have the gas administered. After assuring himself that the patient was not suffering from heart or lung disease, the dentist administered the gas. No sooner had the tooth been extracted than the patient gave a gasp and fell over in the chair. He was placed on the floor and artificial respiration performed, but without restoring animation. The patient was not under the influence of liquor, and five hours had elapsed since last taking food (breakfast). The purity of the nitrous oxide was tested shortly after the accident by the President of the Dental Association, Dr. Beers, who himself inhaled it from the same inhaler. The verdict of the jury was that the man died from syncope, caused by the administration of gas, and they exonerated the dentist from blame.—*Druggists' Circular, September, 1890.*

THE SCIENCE OF ANÆSTHESIA.

AN ADDRESS DELIVERED (EXTEMP.) BY THE EDITOR,

To the State Dental Association of Indiana, at Lake Maxinkuckee in June, 1890; taken and corrected from the published transactions of the Association.

Mr. President and Gentlemen of the Indiana State Dental Association:

I appear before you with mingled emotions of pleasure, professional pride, and yet with some regret. With pleasure, that I may enjoy these pleasant scenes, this beautiful lake and your instructive society; with professional pride, that I am to talk upon the Science of anæsthesia to a body of men, capable of comprehending the truths pertaining to the science and to appreciate them ; with regret that I can not appear before you without some embarrassment on the occasion, being necessarily associated in your minds with business transactions pertaining to my subject. And yet, however, I wish to remind you that my attention has been given more *especially* for over seventeen years to the science of anæsthesia, and that my thoughts upon this subject have preceded my discoveries and inventions. These are the results of a long-felt want. Then in speaking upon this subject, I would divest your minds of everything else than the *Science* and the great truths that lie at its foundation. I am confident that you are just as competent to appreciate these truths as any other body of men.

Then allow me to remind you in so doing, that the science of anæsthesia, is but in its infancy. Within the range not only of my own recollection, but that of others who are here to-day, nearly all the pain-obtunding agencies that are in use, have been brought forth and introduced. And be it said to the credit and honor of the dental profession, that there is no other profession that has done so much to develop this science and has done so much in the way of bringing into use pain-obtunding agencies as the dental profession. I will not stop to recite the history of pain-obtunding agencies—that is of but little consequence. Nor will I say that while the science of anæsthesia is in its infancy, it is due to a lack of writing upon this subject. Much has been written, as you all know, but as you also equally well know, it has been mainly historical, a recital of accidents and incidents instead of investigating facts and thus developing the science.

When we are about to do something, is it not very important that we know definitely what we are to do? Then is it not equally important that we know *how to do it*, and have the *best agencies* to accomplish the *result?*

Anæsthesia—What is it? What physiological condition? When I cast around for a definition, I find that the substance of nearly every definition given by Lexicographers is, that it is a condition in which there is an absence of sensation. That, to my mind, is a definition that does not define. You know that words are the vehicles of thoughts and they should convey them so clearly and distinctly that there will be no confounding. If that definition be true, then death is anæsthesia (and you would smile, if I were to tell you that I have met prominent physicians who would hold that death is anæsthesia). Then asphyxia is anæsthesia; then syncope is anæsthesia; then paralysis of the nerve centers is anæsthesia. And if that gentleman would take a club and paralyze this gentleman with it, that club would be an anæsthetic, necessarily, because the agency that produces anæsthesia must necessarily be an anæsthetic.

Now, I need not remind you that these physical conditions are not safe, nor those that you can depend upon for a safe surgical operation. There is another that I would name anæsthesia, and define it, as a physical condition in which the force and functions of life are in continuance under modification whereby an absence of sensation is induced. Life I will not attempt to describe; but the force of life is free oxygen. It is that out of which vital force is generated. And when you have not in continuance the force and functions of life, and yet have an absence of sensation, you have some other abnormal physical condition; you do not have anæsthesia. In anæsthesia you have no purpleness nor deathly pallor, no matter what your agent is. Anæsthesia is a perfectly safe condition.

Asphyxia is a physical condition in which the force and functions of life, are suspended, abrogated or cut off. You cannot have asphyxia only as you deprive the blood of the necessary *free oxygen* that supplies the red corpuscles to the blood to support combustion and sustain life. I challenge the world to produce a single case of asphyxia, only as the blood is deprived of the free oxygen necessary to support combustion and sustain life. On the other hand, I challenge the scientific world to produce a single case of anæsthesia only as you supply a sufficient quantity of *free oxygen* to supply in due quantum the red corpuscles to support combustion and sustain life. I do not mean oxygen *per se*; I mean oxygen not chemically combined with any other chemical element. The moment you combine it with any other chemical element, it loses its properties and functions. This is a fundamental law of chemistry. When you combine any two chemical elements they lose the properties and functions of either. Take N. O. ; there are five different chemical combinations. $N^2. O^2$.—you know that is nitrous oxide gas, a chemical combination, that cannot be decomposed, only as you apply sufficient heat to decompose the two chemical elements and set the oxygen free. Nitric acid is a chemical combination of the same two elements ($N. O^5$ crystal), which you cannot tolerate for a moment.

The atmosphere, $N^4 O$, is simply a mixture and not chemically combined, and is the only element under heaven that will either support combustion or sustain life, either vegetable or animal. You must have enough of that to sustain life, and no matter what your agent is that you are administering, if you have not enough of this free oxygen, you will have, sooner or later, asphyxia, and if you continue, you will have death. There is no except to it. It is simply a law of nature.

There is another physiological condition that we have denominated syncope, and *that* can only be produced by an action of the intellect. Paralysis of the nerve center can be produced by either an internal or external agent. Now I come to a point that lies at the very foundation of the science of anæsthesia. You know we deal primarily and all the time with the nervous system. It is important that we should have some knowledge of its constitution and laws, for if we violate these, we must look for serious results. Let me remind you that there is a circulation of a substance in every animal and every human being, independent and yet not independent of arterial and venous circulation. The great heart of the nervous system is the brain, and as the blood is sent out through the arteries and returns through the veins to the heart, so this substance (nervo-vital fluid or animal electricity), is sent out from the brain through the motor nerves and returns through the sensory nerves, and there is not a function of any organ in any animal or any human being only as this substance passes out in the motor nerves leading to the muscles of that organ.

If you have paralysis of the nerve centers, you have a sudden arrestation of the circulation in the great heart of the nervous system. There are two agencies that may produce this result. It may be produced by an internal, or external agent by producing concussion. The internal agent is the intellect, the external is chemical or mechanical, and the results are very similar. First, then, I want you to bear distinctly in mind that you can only stop the action of the heart by stopping the circulation of this nervo-vital fluid in the motor nerves passing in to the muscles of the heart. I can not move a muscle of my body only as force is communicated to it. You know that it is accepted by scientists that all force is a unit; that the sun is recognized as the great center of force, and that heat, light, electricity, neural force, etc., are simply manifestations of this unit force, and that they are correlated. Now, in order to move an organ of the body, force must be communicated into the muscles of that organ by the passage of an electric current or nervo-vital fluid through the motor nerves leading into these muscles. Again, we can stop that circulation by producing concussion. We can produce certain effects that will be nauseating by producing concussion in the great heart of the nervous system, or by producing revulsion in neural circulation of the sympathetic pneumogastric nerve of the stomach. Suppose you are extracting a tooth or performing some other surgical operation. A person standing along side of you, looking at the operation and hearing the moaning, grows sick at the stomach, and a little later faints. What is the cause of it? Did you ever think? You say the sight of the blood or the moaning. It is not the sight of the blood nor the moaning primarily. It is true that the sight of the blood causes an action of the intellect that produces revulsion in neural circulation of the pneumogastric nerve, and you have nausea and a little later you have its reflex action in the brain and you have partial paralysis or syncope. This is not due to the sight of the blood nor to the moaning *per se*. You have the very same effect from fright. What is the cause? It is the action of the intellect that produces revulsion in neural circulation of the pneumogastric nerve. The action of the intellect may be so sudden that every function of life ceases as quickly as I can snap my finger. A lady in Charleston, W. Va., a little over a year since had a son killed at a fire. The news was broken suddenly to the mother, and the functions of life ceased instantly. Of course, the Doctors said that death was caused by heart disease. That sounds like this other intelligent expression that we find sometimes in the medical journals, "Died from heart failure." Did you ever know any person to die unless the heart failed? The heart fails always in consequence of a cause. When that mother received that intelligence there was a sudden action of the intellect that produced concussion, revulsion and paralyzation. I have not the least doubt, that if they had had a battery and applied electricity to the spinal column immediately, she could have been resuscitated at once, but they let her remain in that condition until she was dead.

Remember this, that you never have a death of an animal unless that physical condition is preceded by another abnormal condition—paralysis of the nerve center—and that condition may be preceded by another, asphyxia, then paralysis, and then death.

You have these results from the internal agent (the intellect), but you may have them from the external agents. To illustrate, suppose I place our President upon an insulated stand, and fill a leyden jar with electricity and let it into him suddenly; do you suppose the functions of life would go on? What is the cause? I have produced concussion and revulsion, stopping the force that moves the heart. I will fill thirty leyden jars with electricity and let it into the same doctor on the same insulated stand, commencing with a small volume of electricity and increasing it gradually, after I have inducted the electricity for some time, increasing the volume, I will reach a point where, if I had used that amount of electricity suddenly, the functions of life would have ceased; but inasmuch as I commenced with a small volume and then increased, I stimulated the neural circulation, and he is none the worse. I have not suddenly stopped the force which moves the organs of life. Let me illustrate again. We will use a galvanic battery and electrolyze the doctor. We will give him the poles of the battery; and I commence turning the armature regulating the volume of electricity. Very likely the first thing he says, will be, "Doctor, just give me a little." Why? He does not know his capacity. I commence with a low volume of electricity and increase it gradually, stimulating the neural circulation, on and on, and yet it will neither produce nausea nor paralysis. But if I should let it in suddenly, I might let in enough electricity not to paralyze the nerve centers, but to shock him, and what will be the result of that? He will be nauseated. I produce revulsion in neural circulation in the sympathetic pneumogastric nerve, and I have nausea, and, perhaps, if the doctor had a syncopic tendency, he would go into syncope.

You should commence inducting your anæsthetic just as you would your electricity. If you give an over-percentage of a powerful drug in your anæsthetic, you will produce concussion by the chemical action of an over-percentage of that drug suddenly let in.

I have over a hundred illustrations to show that some patients who have either taken ærated chloroform or ærated ether or A. C. E. mixture by the old methods and been anæsthetized, at one time (generally in the colder season of the year), when everything passed off pleasantly, and then at another time (generally in the hot season of the year), when the functions of life would cease at the first or second inhalation.

What is the cause of this result? You will observe that the capacity of the atmosphere to take up and carry, depends upon its temerature. At 60° Fahrenheit the atmosphere is capable of taking up twice as much as it will at 40° ; at 90° twice as much as at 60° or four times as much as at 40° . In the investigation of the cause of these results of the chemical action of the over-percentage, we will use, to illustrate my point, ærated chloroform as the anæsthetic. Remember chloroform is not an anæsthetic. You can not have an anæsthetic only as you have free oxygen to oxygenate the blood to support combustion and sustain life. There is no oxygen in the chloroform, neither in chemical combination nor in a state of mixture. It is simply a paralyzing, or asphyxiating agent. The same may be said of ether. The anæsthetic is your ærated chloroform, and it is only an anæsthetic when you have *enough free oxygen* to supply in due quantum the red corpuscles of the blood to suport combustion and sustain life. That is absolute; without this due quantum of free oxygen, you will produce asphyxia, or you may produce paralysis of the nerve centers, but you cannot produce anæsthesia, because that is a physical condition in which the force and functions of life must be in continuance. Then you can have ærated chloroform, a paralyzing agent; you can have ærated chloroform an asphyxiating agent; and you can have ærated chloroform, an anæsthetic. If you have an anæsthetic, you will get anæsthesia; if you have a paralyzing agent, you may get paralysis of the nerve centers; if you have an asphyxiating agent, you will get asphyxia sooner or later, and you will get death sooner or later; it is only a question of time. It is the laws of nature you are dealing with in producing anæsthesia. Now, why are these fatal results at the first inhalation of ærated chloroform or ærated ether? Why do we have the functions of life cease by one inhalation of ærated chloroform? Simply the chemical action of the over-percentage of your chloroform is communicated to the tens of thousands of nerve filaments that are spread out over a surface estimated to be about 1,400 square feet in an ordinary sized man's lungs, letting in suddenly 15 or 20 per cent. of chloroform in the anæsthetic; the chemical action of that is communicated with the speed of electricity to the nerve centers, and you have a shock (concussion, revulsion and paralyzation), and the functions of life cease.

If you have a battery and apply the electric current properly, you can resuscitate your patient if you apply it soon enough, but you must apply that very soon. You have paralysis, and will have death if the patient is long in that condition. But if you take the patient up by the heels suddenly, and cause the determination of the blood to the brain, which is the great heart of the nervous system, and where this animo-electricity is generated by the presence of oxygen supplied by the blood, you will resuscitate the patient. You will have an electric current, so to speak, sent out in the motor nerves, and the functions of life will go on. The functions of life will not be performed unless you send out the force to perform them, and the force does not exist in the muscles; it is communicated to them; it is made manifest by the sending out this animo-electricity, and if you stop that current the machine stops. Oft times in attempting to produce anæsthesia syncope with partial narcosis is the result, a very unsavory condition.

With nitrous oxide gas you can only get asphyxia. I made and administered a great deal of it in my early practice. You know how we older men used to make our nitrous oxide gas, and how we were taught to believe that there was more vitalizing principle in the nitrous oxide gas than there is in the atmosphere, and yet we could not account for the purpleness and blackness in the countenances of our patients.

I will take a small animal and put it under a bell-jar and give it all the nitrous oxide gas that would be necessary to sustain life, if at all, and one minute and twenty seconds will be the average duration of life—an uncontrovertible proof that it does not sustain life. Or place a plant under a bell-jar and take the air away and give nitrous oxide gas, and you soon see that plant wither and die for the want of oxygen. There is enough oxygen there, but it is chemically combined, and not one particle of oxygen, is imparted to supply the red corpuscles of the blood or sustain life, either in the vegetable or the animal.

I am not making a tirade upon nitrous oxide gas. I am discussing the fundamental principles of the science. If you have anæsthesia you only have it by a continuance of the force and functions of life, and if you have asphyxia you only have it by robbing the blood of the necessary free oxygen. You must reduce the quaniity of oxygen in the blood to about two per cent. or less to produce asphyxia.

Now, as to these experiments with animals under a bell-jar I refer not only to my own experiments, but to experiments made by W. C. Barrett of Buffalo, N. Y., by the New York Medical Society, and also experiments by the Medico Chirurgical Society of London, all to the same effect, proving that small animals, mice, rats and rabbits, will only live about one minute and twenty seconds in an atmosphere of nitrous oxide gas.

Allow me to remind you that there is a theory taught in many of our colleges to this effect (and there never was a more fallacious theory), that it is the carbonic acid that is evolved by physiological action which is retained in the system that produces asphyxia and not the nitrous oxide gas.

Let us take two bell-jars and place two rabbits under them, letting in one nitrous oxide gas, and carbonic acid gas in the other. Now, if this theory be true, if in addition to the carbonic acid gas retained, we have a rabbit plunged into an atmosphere of carbonic acid gas, will it not occur to you, that we will have death very much sooner in this jar than in the jar containing the nitrous oxide gas? The facts are, as we have proven again and again, that you have asphyxia and you have death in precisely the same length of time. I think there is not a gentleman here to-night but who will admit that you can not produce asphyxia in an animal or human being without doing violence to the nervous or physical system, no matter what your agent is. You would not claim that you could put an animal or human being under water and hold him there until asphyxiated and take him out and do no injury to the nervous and physical system. Now, do you not know a human being will live four or five times as long under water as in an atmosphere of nitrous oxide gas? We hear a great deal now-a-days about hypnotizing ; the wonderful achievements of Dr. Hamilton, of New York, and Dr. Dana in this science. Let me remind you that hypnotism and anæsthesia are very similar. You hypnotize or you anæsthetize by operating upon the nervous system through neural circulation. Dr. Hamilton states that he can cause persons to believe that water is wine, and I saw a statement in a paper the other day where Dr. Hamilton was set forth as hypnotizing a patient, causing him to take a paper poker and try to murder a man with it. How is it done? You know that we have recognized that there is such a thing as mesmerism. It is caused by one intellect operating on another through an electric current. You can anæsthetize and you can assist in your anæsthesia by your intellect operating upon that of your patient to a certain extent.

I know there are some here who will appreciate what I say on this subject. To mesmerize or hypnotize a patient you want to have the patient in an acquiescent condition of mind. That is the first thing required. You have, in producing anæsthesia, to secure an acquiescent condition of mind on the part of the patient, and when you have accomplished that you have accomplished quite a good deal toward anæsthetizing your patient. The atmosphere is full of electricity. You modify by one intellect acting upon another through a current of electricity in the atmosphere controlling the neural current.

To produce anæsthesia, or insensibility to pain, you interrupt the neural circulation in the sensory nerves, which communicate from the periphery to the nerve centers. This may be done by either an internal or external agent. The internal agent is the intellect. The external agent is either chemical or mechanical. These two agencies each produce similar results. In producing anæsthesia you want to continue the current of nervo-vital fluid in the motor nerves leading to the organs of life, and interrupt it in the sensory nerves. That can be interrupted in surgical operations by these agents, either separately or jointly. If you anæsthetize the patient, you hypnotize the patient by your use of an external agent, but you may use it jointly with the internal agent.

Now, I want to show how to save life in producing anæsthesia, and how to do away with the usual unpleasant after-results of nausea. You will save life if you never produce paralysis of the nerve centers nor never produce asphyxia. Death must be preceded by the paralyzation of the nerve centers. I have shown that it can be produced by the action of the intellect and it can be produced by an external agent. When you are administering an anæsthetic, it is an external agent, but you may have it by the action of an internal agent when you think you are producing it by an external agent. For instance, when a patient is under the impression that there is great danger connected with anæsthesia. He has read a great many death stories about it. He feels some of the manifestations of an anæsthetic ; a pricking sensation in his fingers, numbness in the hands and knees and creeping all over him a strange sensation. He imagines he is dying; he feels quite certain he is going. Now, I submit that if any of you were quite certain, here to-night, that you were dying and you were of a syncopic tendency, whether you might not go into syncope. There is the action of the intellect producing syncope, and if you have syncope and have partial narcosis, you have a very dangerous condition. There is where many persons meet death. You can prevent syncope by guarding against the manifestations and claiming the attention of the patient while you are anæsthetizing him.

Again, you may have death from the external agent that you are about to apply. As I said, the capacity of the atmosphere to take up at ninety degrees, is twice as much as at sixty degrees, or four times as much as at forty degrees. Now supposing it to be in the hot season of the year, and you administer all of a sudden 30 per cent. of the narcotic element, the chemical action causes concussion, and with one inhalation the functions of life may cease. A physician in Michigan on whom I called about three years ago, told me of an instance beautifully illustrating this. He told me he was positive that the lady only took one inhalation. So far as he knew she was healthy, but the functions of life ceased right there. I asked him, " what was the temperature?" "At least 85°." "Do you know what is the capacity of the atmosphere to take up and carry at 85°?" He had never thought of that. "Well, the capacity is about thirty per cent., and you let in thirty per cent. suddenly on the tens of thousands of nerve filaments spread out over that vast surface, in the lungs the chemical action produces concussion, revulsion and paralyzation."

If time would permit I could relate to you over a hundred illustrations of the same principle. If you never introduce suddenly an over-percentage of your narcotic, and if you are using aerated chloroform as your anæsthetic, you commence with one per cent., and increase it gradually to two per cent., then three, and so on; you never can have the heart fail, as a consequence of your anæsthetic.

As to the discoveries and inventions that I have referred to, I will describe them to show you how we obviate these fatal results. We have a Generator with a dial on it, which you may see at the clinics. It has a water-bath connected with it. We pass a current of air into a tube that passes through the water-bath, and while this air goes through, it partakes of the temperature of the water-bath. It then pases into a chamber or receptacle above, and the current of air is then passed through another tube down to the bottom of the narcotic chamber and agitates the narcotic by the escape of air through small holes in the tube. Then the vapor arises, and as the vapor arises we employ counter currents to change the vapor to a gaseous form. It ascends to the top of the chamber, and then by a tube passes down and then up and out. On top of this Generator is a dial with an index. We regulate the percentage of the narcotic element by commencing with one per cent., giving a few inhalations of that, increase it to two per cent., then on, and we never can produce, by that process, paralysis of the nerve centers. We supply the red corpuscles of the blood to support combustion and sustain life, and if you have got enough for that, you never have asphyxia, and if you never have paralysis of the nerve centers, how in the name of common sense do you get death?

In substantiation of this, we have kept an account of the number of lb. bottles of the narcotic preparation known as "Hayes' Hypnotic," that we have sold, and we estimate that at least 240,000 have taken this without a single death. I will take chloroform, or ether and make either safe by our process of generating and applying.

I am not here to introduce any narcotic preparation. I wanted to demonstrate certain principles involved in producing anæthesia. Then, if you want to see how we produce these results, we are ready to show you the practical workings in the clinics. I thank you gentlemen, for your marked attention.

PSYCHOLOGICAL MEDICINE.—THE INFLUENCE OF THE MIND IN THE CAUSATION AND CURE OF DISEASE.

BY W. WARREN DYSON, M. D., PHILADELPHIA, PA.

With the progress of scientific thought in this advanced age, when logical deduction and a rational line of research have brought the theory and practice of medicine into such intimate relationship, it might be well to bestow some thought on the intimate connection of psychology and its influence in the causation and cure of disease.

It is not the import of this discussion to exhibit the fanaticism of no-medicine faith-cure, or the so-called quackery of Christian science on the one hand, or to depreciate the wonderful reparative powers of nature and the marvelous cures wrought by medicaments on the other, but rather to ascertain in what degree the imaginative influence exerts itself in disordering the economy and what aid we can secure from it in effecting a restoration to health by the influence brought to bear on the mind of the patient.

For the influence the imagination exerts on the vital energies in favoring the production of disease, as well as the power it can wield on diseased states, is no less marvelous in some conditions, more especially where the nervous system is impressionable and thus favors the exhibition of such an agent, than the cures of nature herself when aided by appropriate therapeutic combinations, and its potency for good is of high order.

In remote ages, when superstition was rife and disease was attributed to supernatural origin with the obvious result of the coalescence of the functions of priest and physician in one person, who had resort to all kinds of magic, devinations, sacrifices, etc., the Council of Loadicea, as early as A. D. 366, found it necessary to forbid the study and practice of enchantment to priests, but the temptation to persist for the sake of gain was so great that the Lateran Council, A. D. 1130, had to forbid all medical attendance by the clergy. That they practiced with a fair share of success is certainly true, and we have it on the authority of Theodore Leger, of the French Academy of Medicine, who was a careful student of their treatment, that it is altogether likely that they used a species of mesmerism in connection with their sacrifices and magic, thus demonstrating, what is more than probable, that their chief reliance was centered in the influence exerted over the patient's mind.

We are convinced that we have not as true a conception of the power of imagination in causing disease as we ought to have, for there are very many states the fancies work in, especially when the subject is weighed down by despondency arising from the cares and perplexities of life, which leaves an impression of a diseased state, and these work upon the mind with such telling effect that they are soon convinced of being a subject of disease.

That the mind can exert a powerful influence upon the body might be proven by a thousand instances, even such an insensible tissue as the hair is authentically stated to have turned white from grief or fear. We have seen chorea produced in a child by a fit of jealousy, an attack of spasmodic croup brought on by a lover's quarrel, and cases are numerous where shock of mental impression will cause cessation of the catamenial flow and interrupt for a more or less indefinite length of time the amount and periodic regularity. Jaundice has been caused by a paroxysm of anger, and we have all suffered from a fit of the blues when "the soul melteth away for very heaviness." It is well known that Sophocles died of joy when his last tragedy was crowned with success. Conversely the body can react on the mind, as Voltaire profundly remarks, that the fate of empires is decided by the intrigues of women and the constipation of kings.

Nowhere is the power of imagination so wonderfully made manifest as in the pregnant woman where, from some vivid mental impression made by a thrilling scene or accident, its stamp or counterpart is left on the child in utero.

In epidemics of contagious maladies, such as variola, cases are frequently met with where people have succumbed from mere fear of the disease, thus demonstrating what grave portent the influence of the mind may have on the body by lessening the vital energies, rendering the system susceptible to its action and less able to withstand the contagion.

It must not be understood, however, that the disease would follow such fear without the patient's having come in contact with the contagious principle, but rather that if a strong mind and energetic will back the bodily functions, it will often resist the virulence of the morbific element.

This subject becomes of the utmost importance to the profession, for we have only to contemplate the rapid increase of insanity to acknowledge the force of such a statement, and after considerable experience with the insane and a careful analysis of the causes that lead to its production, we are firmly persuaded that its increase is in a measure attributable to a failure in properly estimating the gravity of sympathetic nervous influence in its inception.

There is an art of separating the true conditions from the false in the discovery of disease and tracing the effects accurately to their hidden and distant cause, and in insanity it requires careful analysis in separating the visionary product of the patient's disordered brain from genuine realities.

Thus it is apparent how much we are indebted to the influence of the mind in the causation of disease, and now, on the other hand, it becomes of value as a means of cure.

Naturally it is in those persons of a highly organized nervous system that the most brilliant results are to be expected. In these cases the imagination often acts with the greatest detriment in defeating our measures for relief.

It is not a matter of any wonder in this still superstitious nineteenth century that cures have been said to be effected by the Faith and Christian science doctrine adherents, depending as they do on the stimulation of the mind, and whatever may be said for or against the course they pursue and the doctrines they uphold, there is a germ of merit mixed up with their system which it might be well to consider from an unprejudiced standpoint, and it lies in the influence they exert over the body through the mind, and there is little room to doubt that whatever success they anticipate or have with their patients is centered directly in this influence.

We can influence disease to a surprising degree if we assert an influence over the mind of the patient superior to that which the patient's ailment exerts on his mind.

The invalid often finds relief from his complaints less from the healing virtues of medicine than because his system of ordinary life undergoes an entire change in his being removed from his business cares or from whatever else forms the main source of his constant anxiety at home, destroys his appetite, mars the custom of his exercise, deranges his digestive powers and clogs up the springs of life.

There is no disguising the fact that there are very many disorders which would do just as well, and in many cases far better, by letting nature exert her office unattended by medicaments, supplementing in their stead a healthful influence on the mind. The more intelligent medical thought of the day voices this sentiment.

The greater degree of intelligence the patient possesees the more easy it is to guide them by such counsel, but with the more ignorant we cannot have recourse to such enlightened modes of practice, for among these our insight to disease and ability would be questioned by the suggestion of such a course, for there are many who believe in physic and will place no faith in a more royal road to health.

Happily in this latter class the mind is not very often a factor in causing disease, and hence it is not so potent in curing it. Even where grave disease exists the mind may exert a powerful influence for good, and this must be put in action by the hopeful mien and cheerful countenance of the medical attendant, for this will have in many cases a salutary effect on the mind and spirits of the patient, which, reacting on the body, will pave the way for a more radical cure by medicament and nature's aid. Besides this the fear of death often acts with such telling force on the imagination of the patient that it is detrimental to our highest skill in effecting a cure. We should not be slow to provoke antagonism to such an impression, and no matter what our misgivings are, we should certainly combat this influence with unshrinking courage. The patient should always be encouraged to hope for the best results, and not be harrassed by the doubts of the physician to whom the empirical natnre of treatment is only too obvious. There are some practitioners who acquire over their patients almost a magnetic influence, and their success ably demonstrates the value of psycholocgical aid in the treatment of disease.

It is the influence of the mind on the body and the strength of the constitution that keep many of the sick alive.

Thus it is perceived that through the medium of the sympathetic nervous system, we have a powerful agent, both in the production and cure of disease. When physicians will intelligently usher this means of cure into more extensive use its utility will be rendered the more manifest, for it will undoubtedly fulfill the indications in those cases of nervous susceptibility to disease where its range of usefulness is greatest with a certainty admitting of no rational dispute.

We can arrive at perfection in the healing art—if that state can ever be attained at all—only by careful thought, a correct weighing of cause and effect, a long keen and practical study of symptoms, a thorough comprehension of mental phenomena, and by a large instinctive knowledge of human nature.

The popularity of prescribing from mere outward symptoms is a danger near to physicians, and the success of our work would be largely increased by a more thorough observation and careful inquiry into sympathetic nervous influence as a favoring factor both in the causation and cure of disease.

We are too often the dupe of our imagination, especially during our earlier experience, and are apt to place too much confidence in our theoretical knowledge of disease. We should penetrate the character of individual symptoms, and must not jump at conclusions from a mere glance at the visible signs presented for the summing up of our judgment, for if we do we will be a slave to first impressions and too often a victim of error in diagnosis.

The real regard for our work should be rooted in the satisfaction it gives us to conceive the cause of disease and perform a cure, and in our success oftentimes when we have rescued the patient from the very jaws of death, and caused the grim rider of the "white horse," who seemed already to have loomed into view, to return again to the shadowy vale where he so often secretly lurks, we might well be excused if the thought of our acheivement brings to mind that poetical Biblical sentence, "O! grave, where is thy victory!"

How to Avoid Dark Joints in Sets of Teeth.—With a true running lathe, and a coarse and fine corundum wheel, with a half inch face, bring the two front blocks together square, outside and inside. After you have them together, V them slightly on the inside. For the bicuspid make the V a shade heavier, the molars the same as the front. I have no trouble about dark joints, and never use plaster or cement in the joints, as it only leaves a place for bad smells. I use the face of the stone in jointing.—*J. A. Houser, D.D.S.*

PROGRESS OF SCIENCE.

Through the courtesy of Prof. A. J. Brashear, we take the following extracts from his Address to the Engineers' Society of Western Pennsylvania.

Progress is to-day written on every page of the world's record; and particularly in the realms of science is it making its unmistakable mark; from thence extending outward to the vast range of correlated studies that go to make up the sum of human knowledge and economies. In astronomy and astronomical engineering, in physics and chemistry, in civil and mining engineering, in meteorology and in metrology and in mechanics, to say nothing of many other branches of science, do we find progress as the watchword, and the theme that excites and moves the human brain to grander and better achievements.

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It needs no words from me to call to your mind the vast strides that are being made all around us in electrical science, nor is it my intention to elaborate upon the subject. But in connection with the theme of this paper, I may mention the great improvements being constantly made in the refined instruments for electrical measurements. When I call to mind the first induction coil made by Faraday, and which only a year ago I held in my own hands, I compare it with the beautiful and thoroughly practical instruments made within the sound of my voice. Is this not a marvelous age of improvement? Not only do we have our ammeters, our volt meters and our galvanometers measuring currents so minute as one hundred millionths of an ampere as well as the most enormous currents of electric energy, but made just across the way we have our electric meter, measuring out to you and I, the "subtle fluid" in quantities to suit our most fastidious tastes.

I may mention here that science is largely indebted to a little instrument called by its inventor the "Bolometer," for some of the most charming discoveries ever made in the realms of radiant energy. It is essentially an electrical instrument, as its action depends upon the resistance to a feeble current, by a most delicate strip of platinum which, when connected with a delicate galvanometer at once registers forms of energy coming to the earth from the sun, hitherto unknown, yet of so important a nature that did it not exist, life would not be possible upon this planet. It has brought us news from the sun and the moon that gives new life to the study of what Prof. Langley has well named "The New Astronomy." The delicacy of the measurements made with the bolometer may be appreciated when you learn that under certain conditions a deflection of one millimeter on the galvanometer scale is registered by a current of 0.000.000.000.5 (five billionths of an ampere) through the coils of 20 ohms resistance, and when the observing telescope is used on the divided scale, one-tenth of this deflection can be readily determined, and if we put this in temperature coefficients, one billionth of a degree centigrade can be indicated, while 0.000.000.1 of a degree may be indicated and measured. It is with such an instrument that Prof. Langley has opened a new world to us, particularly in the infra red end of the spectrum, and has told us in the plainest terms that were it not for the invisible rays of radiant energy (invisible to the human eye) human life would be an unknown quantity upon the earth. But I must not dwell on these enchanted grounds, else I may be arrested by the fairies who have no love for long-winded people. * * *

In the realms of the higher sciences the mind of man has reached, as it would seem, almost to the infinite. The mind may think and think, but human ingenuity is surrounded with so many hindering environments, that it cannot execute the commands of the brain; but we can approach to that boundary line where the sign-board tells us, in unmistakable characters, "thus far shalt thou come, but no farther."

Sir Wm. Thompson has estimated the size of the molecule to be somewhere between one two hundred and fifty millionths of an inch and one five billionth of an inch. And in that beautiful illustration familiar to most of you, tells us "if a drop of water were magnified to the diameter of the earth and the molecules magnified in the same proportion, that the smallest as noted, would be coarser grained than a heap of small shot and the largest, less in diameter than a heap of cricket balls." Can we therefore ever hope to deal with such infinitesimal quantities? possibly, probably not and yet one cannot tell what a day may bring forth. The organs of sense in man have some marvellous capabilities. The human retinal nerves, for instance, have astonishing powers of discrimination. Prof. Rood has shown that a flash of light lasting but forty billionths of a second is capable of making an impression upon the human retina. Prof. Langley has shown in his charming monograph on "Energy and Vision," that the visual effect produced by any given constant amount of energy varies enormously with the color or wave length producing it, and that while we may perceive a white light in so short a time as Prof. Rood has shown, yet for the actual physiological processes required in seeing, we require from one quarter to one half a second. He then shows that the *vis viva* of the waves of light whose length is 0.75 microns long, when arrested by the human retina, *represents* work done in giving rise to the sensation of crimson light, of 0.000.000.000.0003. or three ten trillions of horse power, or about 0.001 one thousandth of an erg, while the sensation of green can be produced by 0.000.-000.001, or one hundred millionth of an erg. Moreover, he has shown that the human eye has a vast range in the intensities of lights it can perceive, represented by the ratio of 1 to 1.000.000.-000.000.000, or one to one quardrillion. Prof. Nichol has also shown that some human eyes are capable of discriminating tints of color so rigorously as to detect one part of coloring matter in one hundred million parts of white. Here, then, I have given you a few instances of the remarkable powers of one organ of the human economy, an organ that we use so constantly in all our refined measures and manipulations. Who then can tell the limits of human capabilities for grand achivements in the future? The world's great workshop is open for all of us. She needs master-workmen. As the laws of mother nature are more unaltcrable than those of the Medes and Persians—and if we shall pursue our work in conformity to their demands, so shall we ever make progress towards perfection. And although the goal may never be reached, there is a happiness and triumph in knowing we have taken steps in advance of those before us, and have set the example of patience and progress to those who will follow after us.

Let us then be up and doing,
With a heart for any fate.
Still achieving, still pursuing,
Learn to labor and to wait.

ANÆSTHESIA IN SMALL OPERATIONS.

For this purpose Dr. A. Dobisch, of Zwittau, recommends spraying the parts for one minute with the following: Chloroform, 10; ether, 15; menthol, 1. This produces complete anæthesia of the skin, lasting from 2 to 6 minutes.—*Journal American Medical Association.*

RESUSCITATION IN THREATENED DEATH FROM CHLOROFORM.

DR. F. T. MILES, BALTIMORE, MD.

It being now generally conceded that the best means of resuscitating patients threatened with death during the inhalation of chloroform is to invert the position of the body, it is a matter of interest to consider how this change of position accomplishes the result aimed at. The explanation usually given, that the blood is sent in increased amount to the centers innervating the heart and the apparatus of respiration, seems unsatisfactory, when we reflect that the cranial cavity is so nearly a completely closed one that the amount of its fluid contents can scarcely be expected to vary to any considerable extent through gravitation. Again, if the heart has ceased contracting, the effect of gravity will be principally on the blood in the veins, diminishing its onward flow, and thus tending to arrest the movement of the blood in the capillaries. Now we know that stopping the movement of the capillary blood is one of the most prompt and effectual means of destroying the activity of the nerve centers. Again, the danger of life from the action of chloroform arises from stopping (I do not say paralizing) the heart, and while we know of a cardio-inhibitory center in the medulla oblongata, the excitement of which will slow or stop the heart, we know of none whose excitement will increase its strength or arouse its activity. We must therefore look for some other explanation of the beneficial effects of the inverted position.

It appears to me the strikingly good effect obtained by inverting the position of the body results from the direct excitation of the heart caused by the flow of blood into the right auricle (and ventricle), which takes place when the body is in that position.

The liver is roughly computed to contain one-fourth of the blood in the whole body. The length of the vena cava inferior, from the point where the hepatic veins open into it to its ending in the right auricle, is quite inconsiderable, and it is held open by its adherence to the comparatively unyielding substance of the liver. It is further kept patulous by its attachment to the tendon of the diaphragm just before emptying into the auricle. The hepatic veins, in their course through the liver to empty into the vena cava, cannot colapse, being adherent to the hepatic substance. All this is favorable to the pouring, so to speak, of the blood from the liver into the right auricle and ventricle when the body is inverted. We know from experiment that one of the most potent means of exciting the excised frog's heart to renewed activity, after it has ceased to beat, is to fill its chambers with blood or other fluids, and I do not see why the sudden distension of the auricle in the human body should not act in a similar manner.

Moreover, it is not impossible that a mechanical influence may contribute to the beneficial effects, inasmuch as the inversion of the body is brusquely made, and thus the sudden pressure of the heavy liver against the diaphragm and heart may act as a mechanical stimulant to the latter.

I have seen one case at least in which, during the inhalation of chloroform, death seemed imminent from stopping of the heart, and in which the organ was stimulated to contraction by pretty heavy blows administered with the open palm over the cardiac regions.—*Medical Record.*

GAIN AND RETAIN THE CONFIDENCE OF YOUR PATIENTS.

BY DR. A. N. FERRIS, WATERLOO, IOWA.

By keeping a clean, attractive, cheerful office, in *all* its departments, from the entrance to reception room, to the corner behind the labratory door.

By keeping chair and operating table dusted, and instruments clean and disinfected. It will also help, if we have a neat, pleasant assistant to do this in sight of the patient.

By operator and assistant being cleanly in person; and to be so, must necessarily be free from the odors of tobacco, and worse, the fumes resulting from the handling of horses.

Try and manage, apparently innocently, to have the patient see you wash your hands after leaving one patient before operating for another. Also, at all times show a pleasing, polite, gentle manner, even though you feel very angry at some perplexing thing or person; but, ever be firm in your idea of right, without being overbearing.

By educating our patients in dental science, in talking sufficiently to make them have confidence in the results of the art, and thus increase our practice, as well as greatly benefit our patients.

By saving our patients pain and unpleasantness in all ways possible; for instance, instead of excavating a sensative cavity exposed to the fluids of the mouth and with dull instruments, treat the teeth to an application of rubber-dam protected from the lips by a soft napkin, and excavating with sharp instruments—the most efficient obtunder I have found.

In all care to save pain, do not slight the operation; for, while gaining present confidence, you are most certain to lose it in time to come, on account of failure to do lasting operations; but explain the necessity of pain and the good results from bearing it.

. By making uniform, honest fees; because, if your fees to near neighbors differ for the same kind of work, they will think you dishonest. Have the same fees for every one, and if you wish to help poor people, give them something and make them understand it is a gift and not a cut from regular prices.

Pages might be written on this subject, but time and space will not permit at present. While I do not expect this to be a help to the many successful men in the profession, yet it may add a few hints to the numerous unsuccessful, careless operators, and assist them to look up and on to a more ennobling and beneficial end.—*American Journal of Dental Surgery.*

BACTERIAL COMPLICATION OF WOUNDS.

BY A. W. M'ALESTER, A. M., M. D.,
Dean, Medical Department, Missouri University.

As the study of pathological micology advances, we realize the nature of many hitherto misunderstood complications of wounds. Until late years, we thought the complications in the practice of surgery were scarcely more than two: Septicemia and pyemia, and various affections were classed as ordinary medical cases, which bacteriology has placed definitely among the surgical diseases. Under the heading of surgical affections we now find (from the classification of Cornil and Babes): vesico-pustules of the dorsal region of the fingers; paronychia (felon, whitlow); conglomerated perifolliculitis; furunculus and anthrax (boils); erysipelas; warm abcesses; phlegmons; lymphangitis; thrombus; phlebitis; metritis and puerperal inflammation; pyemia; septicemia; sapremia; arthritis; osteomyelitis; certain forms of endocarditis, myocarditis and nephritis; omphalitis; hemorrhagic septicemia; gangrens; gaseous gangrene; tetanos.

Some of these, such as erysipelas and furunculus, appear often as spontaneous, and many are the physicians who deny their specificity. It is to Ogston and Rosenbach that we owe most of our knowledge on the etiology of these surgical affections. Their deep investigations have thrown a brilliant light on all the complications of wounds of various nature.

Though the bacterial diseases consecutive to wounds have different appearances, and present different specific symptoms, they nevertheless, have something in common. They are all characterized by inflammation, and in nearly all there is some form of suppuration more or less pronounced. Several of them may produce the complications known as septicemia, pyemia, gangrene, and several may cause embolism. On the other hand, the biology of the respective causative agents establishes their relation.

The pathogenic microbes, discovered in connection with these diseases, nearly all belong to the class of cocci, which are disposed in chains or masses. The most common are:

First. Staphylococcus aureus, found by Pasteur in furunculus, and existing in the abcesses of pyemia and of osteomyelitis. It was seen also by Cornil and Babes in some cases of ulcerated endocarditis, gangrenous pneumonia, purulent pleurisy, cerebro-spinal meningitis and parenchymatous nephretis. Externally it was found in the air, soil, kitchen water, on the surface of the skin, under the nails, in soiled clothes of healthy children. It is occassionally found associated with the parasites of actinomycosis, tuberculosis, glanders and other maladies. By inoculation it can by itself produce abscesses.

Second. Staphylococcus flavescens, resembles much the preceding, and has much the same properties. It may be distinguished chiefly by the differences in artificial cultures.

Third. Staphylococcus pyogenes albus which has the properties of the preceding, but differs in cultivation.

Fourth. Streptococcus pyogenes. This organism, which appears in the form of chains, presents several species, one of which seems to be the actual cause of erysipelas, and another the cause of warm absesses, though, as we have said above, other related micro-organisms have been found in such cases also.

Fifth. *Streptococcus septicus* of pus. It resembles the preceding somewhat in shape, but is much more pathogenic in pure inoculations.

Now there is a microbe described by Passet, that justly belongs here on account of its properties, though it is placed in a group of differently shaped germs. It is the *bacillus pyogenes fœtidus*. A strong odor of putrefaction characterizes its growth.

In many complications of wounds, various other germs may be found associated with these specific pathogenic forms, but they seem accidental visitors. Possibly, too, they work injury in the company with the others. It is easy to appreciate the means of ingress in various surgical cases, such as amputations, abdominal operations, obstetrical cases, etc.; but it is difficult to explain the entrance of microbes in such diseases as furunculus and some cases of erysipelas. This point is somewhat theoretrical. The appearance of furunculus is usually in regions where the skin is subject to friction, such as the neck by collars, the wrist by cuffs. Lowenberg thinks that the bacteria penetrate by the pilo-sebaceous follicules. Whatever may be their means of ingress, they may be found in the affected parts even though no visible external opening be discovered. Garre has shown, it is written, that the staphylococcus may penetrate even through healthy skin.

The same thing may be said as to the entrance of the parasite of erysipelas, in which sometimes no visible wound is present. Frequently, though, a slight scratch or abrasion had risen and given passage to the organisms, and then healed, leaving no trace.

The local bacterial complications of wounds (such as have been mentioned) may pass off by nature's own efforts or aided by medical or surgical means. They are individually specific in their nature and somewhat independent in their localization, though, as we have seen, related from an etiological standpoint. Microbes of the same order, and with properties very similar, have independent pathogenic powers resulting in the lesions found in each disease locally. But they may be found associated and thus complicating still more a wound, and again, as stated, they may have the company of germs ordinarily harmless, which find in the *diseased* tissues fit soil for their growth and multiplication, thereby aggravating the primary complications.

Pyemia and septicemia are the results of local bacterial complications. At first, there may be only a local abscess, or suppuration of some character or other in a wound; both are the result of germ life. But soon fever appears, there is subdelirium, prostration, and various symptoms indicating general infection or intoxication of the system. It is partly the result of migration of the septic microbes in some important organs, perhaps their generalizatian in the circulation, and it indicates besides and chiefly the general poisoning by the toxic products generated by them.

The nervous symptoms are conclusive evidences that an impression has been produced by a toxic substance. Such nervous poisoning may be compared as to its origin with alcoholic intoxication —alcohol being the product of a living ferment.

The most important point in the treatment of wounds, therefore, is the prevention of access of micro-organisms. Without them there can be no complication such as has been mentioned here, and hence no pyemia, no septicemia.

There is another form of blood poisoning; it was named *Sapremia* by Duncan, Ogston and Rosenbach. It is that which results from intoxication by products of putrefaction. Occasionally germs of putrefaction decompose blood or diseased tissues in living individuals, and produce nauseous odors and poisonous substances. Such things occur more frequently in obstetrical cases. It goes without saying that this comparatively rare form of septic poisoning can be avoided as the others mentioned, and by the same means.

Besides the complications that I have mentioned, there are a few others of serious character that deserve special discussion, but my space is too limited to do them justice. However, I will mention them. As far back as 1856 Virchow and Beckman recognized zooglea in ulcerous endocarditis. More recently Mayer, Klebs, Orth and others gave us a good description of the bacterial, granulous and ulcerous forms of this inflammation.

In their recent and admirable work on bacteria, Cornil and Babes describe pyemic myocarditis, and illustrate the presence of cocci in the muscular tissue of the heart.

In the same work, we find descriptions of various bacterial nephretis consecutive to wounds or infectious maladies.

Tetanos is another usually fatal malady now classed among the parasitic kind of bacterial order. The germs are found in the earth, manure and other places, whence they may penetrate through small or large wounds into the system.

But enough for this time, hoping to be able later to treat each malady individually.

AN IDIOT'S SKULL.

Wonderful Surgical Feat.

During the past four months the surgeons attached to the Hahneman Hospital, of Philadelphia, have performed some wonderful and successful operations in head surgery, a branch of the profession in which cases of fatal issue much outweigh those that are successful. The last operation was performed yesterday afternoon. It was a case of microcephalus, or small head, and was the fourth operation of the kind ever performed. The first two go to the credit of Dr. Lanolog, of Paris. The third case was successfully operated upon by Dr. W. W. Keen, of this city. The Hahneman case was that of a girl 4 years of age, whose head had not increased in size since the age of 5 months. Otherwise the child was well developed. She was admitted to the hospital as an idiot, unable to walk, talk or help herself in any way.

Brain growth had been arrested by the closing of the skull sutures, and it was to relieve the brain and give it chance for growth that the operation was performed. An incision was made through the long diameter of the scalp from front to back. A half-inch trephine was applied and a button about the size of a ten cent piece removed, after which, with a mallet and a chisel and a pair of Keen's forceps, the skull was removed for a distance of four and one-half inches, five-eighths of an inch wide. The object is to give the brain a chance to expand, and it is expected the operation will be successful. The child was under the knife 48 minutes.

Saturday last two operations in head surgery were performed and both patients are in a fair way of recovery. Case No. I was that of a young woman 24 years of age, who for the past ten years had suffered excruciatingly from apopletic convulsions. When the patient was 14 years of age she received a violent blow on the left side of the head from a fall. Immediately thereafter the convulsions set in. They generally came on at night, and from being trivial at first increased in virulence until five weeks ago, when the attack was so violent that partial mania of a homicidal character ensued. These convulsions lasted from five to eight minutes, and she had as many as seven in a single night. After each attack the patient was left much exhausted, and her mind, which was originally bright and active, became much impaired.

The sufferer was admitted to the hospital four weeks ago and a careful study was made of the disease. Finally the seat of the malady was localized, and on Saturday preparations were made for the operation. First the patient's hair was removed and the scalp cleanly shaven, after which it was washed and enveloped in bandages steeped in an antiseptic solution.

After the patient first mentioned was properly etherized, she was removed to the operating room, and after carefully cleansing the head an incision was made about four and one-half inches long on a line with the ear and about three inches above it. The scalp was dissected back a distance of two inches and a three-fourth-inch trepine applied. The skull was unusually thick, measuring three-eighths of an inch, and after the first opening was made it was found necessary to remove two similar "buttons" of bone, in all 1x2 inches. The brain could be seen pulsating and the blood vessels of the dura mater were found much congested. The dura mater was picked up by a pair of delicate forceps and incised, exposing the brain substance itself. A small galvanic battery was now brought into use and a tiny brain electrode, with very slender needles, was introduced into the brain. When the electrode was applied to the suspended area of brain the patient was attacked with the customary convulsions.

Repeated tests with the electrode finally determined the exact area of the diseased portion of the brain, when with a delicate pair of scissors a three-fourth-inch cube of the brain substance was cut away.

The surrounding area was then tested with the electrode and found healthy. After controlling the resultant hemorrhage, which was very slight, the dura mater was drawn together and stitched with catgut, after which the scalp wound was stitched and the usual antiseptic dressing applied. The operation lasted over two hours, and it was nearly ten hours before the effects of the ether passed away. Yesterday the patient was able to converse with the attendants, and will recover.

THE EDUCATION OF PHYSICIANS AND DENTISTS.

BY PROF. H. C. WOOD.

The American medical profession has in it a multitude of rightly educated physicians, but it comprises also an enormous number who are but partially educated in their profession. Of all places in the universe, in America there are doctors and doctors.

The American medical profession cannot be in any degree held responsible for its condition, not merely because it has no power over its own members after they have entered, but especially because it has no control over the gates through which men flock into it. In some States the law allows any one to set up as a doctor who wishes; while where there is any law regulating the mode of entrance into the profession, such law usually puts the power of granting the right to practice into the hands of the medical college. To be sure the medical college is nominally required to examine the candidates, and to shut out the unfit. Almost any small group of physicians can, however, constitute themselves a medical school, and conduct their examinations so privately that no outsiders can know whether these trials be substance or shadow. The national vice, the imperative desire to get on in the immediate present, fills the land with persons who wish to get the right to practice medicine at the lowest outlay of money, time and labor. For these candidates the schools bid, one against the other; and so the standard falls lower and lower, medical education becomes a farce, and the doors of entrance to practice stand wide open to any one who can raise a few hundred dollars.

At the recent examination for the Army Board, of thirty doctors who had been picked out from among the best graduates, and had been especially prepared for the army examination, only two reached the required standard. I believe myself that not twenty per cent. of the graduates of medicine in America could pass the State examination required in Germany for license to practice. Humiliating though it be, yet it is true that an American medical diploma has in itself no meaning, and that it will never be a true certificate of technical knowledge and education until it is supplemented by the law.

If such language can be appropriately used with reference to the medical profession, medical colleges, medical examinations, and medical diplomas, is it not worth while for all concerned — practioneers, professors, students — to inquire how far it is applicable to existing facts in similar dental relations. The national vice, the imperative desire to get on in the immediate present, it is not unreasonable to suppose, is as potent in dentistry as in medicine, and unless sedulously guarded against, the sequence will correspond, the standard will fall lower and lower and dental education become a farce.—*Items of Interest.*

IS IT PROPER AND PROFESSIONAL FOR DENTISTS TO OBTAIN AND HOLD PATENTS FOR THEIR INVENTIONS? *

BY JAMES E. BYRNE, NEW YORK COLLEGE OF DENTISTRY.

It was written by the Poet Laureate, "The old order changeth, yielding place to new, lest a custom should corrupt the world."

In our present age and country this is doubly true. No custom or practice is, or can be, so old or set about with guarantees, customs, habits, or usages, but that it must submit to be examined in the growing light of our times, and discussed by our better reason, aided by the experience of the past.

As intelligence increases, so grows the spirit of inquiry, and now it would be as vain to try and still the wind, or fetter the tide, as to endeavor to hinder the march of mind. Bolder and stronger minds will investigate and will discuss and profit by the results of such investigation, caring for nothing but to win success.

In view of these facts, I propose to discuss for the time allotted to me the question, "Is it proper and professional for dentists to obtain and hold patents for their inventions?"

While it is not for me to decide a question of so much importance, still I propose to present some of the arguments which have been adduced on either side of this question, and then leave the matter for the further consideration and discussion of the profession.

It has been suggested that as dentistry is a part of the great science of medicine, it should be governed by and loyally obey all the rules of medical ethics. That as these rules are gray with age, and enriched by the wisdom and experience of an hundred years, their claim to obedience should be unquestioned and reverently acceded.

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* Read before the Students' Society, N. Y. C. D., January 6, 1890.

One of these rules forbids that a member of the professon shall monopolize his own inventions, and as dentistry is a part of medicine, it would be dishonorable and unprofessional for a dentist to disregard this rule and obtain a patent monopoly of his own invention.

This at first view seems fair enough, but the men who are interested in patents will naturally ask when and by whom these rules of ethics were established. If they should determine that they belong to a past age, when the thunders of the Vatican could dethrone kings and frighten nations, they might be inclined to rebel, and to say that we are living in the present, not in the past.

The opponents of these strict rules claim also that, if carefully followed, they would have effectually prevented the whole profession from advancement, for they claim that the tendency is to dwarf the mind or the young practitioner, to prevent him from competition with his older brethern, and to cramp him into a narrow compass. Now all this does not seem true to the upholder of the code of ethics, but if their opponents really believe it to be true, can we blame them if they act accordingly?

It is said that the dental profession is "a dispenser of blessings and comforts to all who come under its enlightened and beneficient healing;" a mission of mercy to mankind; and that each member of the profession should be filled with unselfish ardor, in view of his high mission to suffering humanity, that the results of his experiments, however costly, and his inventions, however laboriously obtained, should, for the sake of this same suffering humanity, be announced to the profession at large, so that the whole fraternity may reap the benefit. That any person who has any other view of this matter looks upon dentistry in no higher light than an earner of his bread, no higher than a donkey to toil before his cart of self-profit, whose hide and bones he would be glad to sell when they can no longer serve him.

But the pro-patent men say: "Softly, softly, my friend! What took you into the dental profession? Did you go into it in the crusading spirit of Don Quixote, or did you go into it to earn an honest, honorable living? No man is his own—all he has and all he is, are only held in trust."

Every honest man should in due time have his own home, in which to cherish and nourish his loved ones. It is for them that he holds all in trust: his talents, skill, enterprise, business ability, inventions—are all as much his property as the money in his pocket, and, as we have already seen, are only held in trust. Shall he love his profession more than his family? Shall he make a Moloch of his profession and grimly sacrifice his family upon the altar?

Professional ethics and professional ardor must yield to necessity, ease and common sense, and so it cannot be justly expected that the more ingenious part of the profession will furnish the duller portion with a stock in trade, free, gratis and for nothing. Has any of this class learned the business for nothing? This is the day when money is necessary to furnish the necessities and comforts of life, and dentists and their families need them as much as anybody; so the same rules of prudence, caution and frugality that apply to the doings of other men, apply with equal force to them. What sane man in all the wide world, should throw away valuable property, when the property can easily and effectively be secured by law?

Sentiment is good enough in its place, but money buys bread and clothes, and provides for many of the other necessities of life.

On the one hand it is pointed out that the obtaining of patents by the profession creates monopolies, by means of which prices are kept up, and the burden of this higher price eventually falls on the patient. On the other hand we are told, by way of objection, that patents cheapen processes, decrease the amount of skill required, and so open the way for quackery in the profession.

As these claims are diametrically opposed to each other, might it not be profitable for us to ascertain which of the two propositions is founded on fact?

The pro-patent men claim that all such propositions have long ago been answered by the inexorable logic of events.

When the tailor and seamstress had nothing but needle and shears, it required the very best skill to make a good garment, and the consumer had to pay a high price for that skill. The sewing machine was invented. Then the cry was, these people that have the patent, will set up their monopoly so poor people can't buy machines, and they can't compete against the cheap work of the machine, and so the poor dressmaker and tailor will starve.

Another class cried, they will set up a lot of "cubs" to work who don't understand the business, and so the work will be horrible.

How did it turn out? The beneficent patent law left room for a second sewing machine patent, and then another, and then another still, until now the name of sewing machine patents is legion, and the competition among sewing machine men, is so great that a good machine is within the reach of the poorest sewing girl in the land. And how is it, as to work for the poor operators? It has increased ten-fold' Think of the business in ready-made clothing, a thing almost unknown before the invention of the sewing machine! And how about the consumer? To-day we can buy a suit of ready-made clothing for almost one-third of what it would have cost thirty years ago. The material is fully as good and the workmanship much superior.

Surely this is a great gain, which we owe largely to the patent law, and this is only one department in which it has exerted its benign influence. In fact, the pro-patent men cry exultingly: What of all your material comforts is there that you do not in some measure owe to patents?

And then they sneer and ask: Will you be laggards in the march of men? Will you be left behind when all the world but you moves onward? Will you live in the dead past, or will you cast your lot in the living present?

The anti-patent members of the profession claim that it is very illiberal, that it is a great disgrace to members of a liberal profession, for one dentist to compel brother dentist to pay tribute to his secret process or his newly invented instrument. That if carried out in its fullness, such a course might give one member of the profession the power to make all the rest subservient to him; that one dentist in an obscure street might buy a patent for a whole city on a secret process or some improved instrument, and then if other and better men wanted to use the same inventions, they must pay him royalty or submit to tedious and expensive litigation. That every dentist ought to be a teacher and for that reason ought to have no secrets in his profession which he would not gladly communicate at the first opportunity to his brother dentists free and without charge.

To this the pro-patent men reply, that in this happy land we know of no distinctions of any kind among men, except those which are won by honest effort; that class distinctions are dead and gone. All men are born equal, all men are born alike before the law, and whatever real difference may be found among them arise only from their own doings. In this uncompromising democracy, "distictions do not spring from the dust," but every man is the architect of his own fortune. These men very naturally inquire, What rights have dentists more than anybody else? Can it be possible that in this free country, that we have retrograded so far in to the dark ages, that one part of any calling whatever claims that it has a right to the free use of the inventions and discoveries of the other part of the same calling? That dull, lazy, ignorant people shall profit by the skill and ability of men who by industry and study have found out better things? All such ideas are un-American; they belong to the past; they have no place in our age and generation.

A careful investigation of fact shows that necessity is the mother of invention, and often "mother necessity" is "gray old poverty."

Our law benignly recognizes this fact, and acknowledges that every man's invention is his exclusive property, aud says to every inventor on earth, without distinction as to race, nationality, occupation or condition, we know that your invention is your exclusive property, and that it would be unjust and unlawful to deprive you of it without your consent, and as we well know the world is full of pirates, who would gladly steal your invention without any pretext whatever, we will, if you will make a full disclosure to our proper authorities, fully describing your invention, give you the exclusive right to make, use and sell your invention for seventeen years, and will protect you against all comers for that length of time; but as that will give you ample time to reap all the benefits that ought justly accrue from your invention, at the expiration of that time your invention must become common property for the free use of all concerned.

Now what right, either in law, equity or morals, has any association of men to set themselves in opposition to this law, and attempt to teach contrary to the enactments of Congress?

Suppose that the machinists should have resolved themselves into a close corporation, and said that it is unbecoming of the craft for any machinist to secure his inventions, and had taught their apprentices that it was their duty to at once inform their fellow craftsmen of all the improvements they might make as soon as they were completed; that the lazy, ignorant ones must be carried upon the shoulders of the industrious and intelligent ones; where would our factories and railroads be to-day? Like they are in barbarious lands where no patents are granted. Even the Sultan of Turkey, irreclaimable savage as he is, has found out a few facts in this case, and now actually will, once in a while, on strong provocation, grant a patent.

It will not do to say: "Oh yes, this is all good enough for sordid mechanics, but we of a liberal profession are governed by different rules."

"Are you in very deed?" cry the pro-patent members of the profession.

"When and by what authority were you empowered to make law?"

You are quite a small part of the body politic, and now what right have you to set yourselves up against the great mass of the people? When the papacy set itself up to think and act for its votaries, it stayed the wheels of human progress through all the dreary night of the dark ages. It was this great power that compelled grand old Gallileo to kneel in one of its costly fanes, and with uplifted hands swear that the microscope and the telescope were both witchcraft, that it was not true that the solar system revolved around the sun, that he sorely repented having practiced the one and believed the other.

Methinks that in spite of the pathos of this story, the childishness of the Church provokes a smile.

Do you not think, that in the near future, it is barely possible that some brave, strong men will smile at your teachings and riddle your rules of ethics, as the bold reformers tore the obstructions in the way of free thought to tatters?

Would it not then be wise to trim your sails to the coming wind, and avoid total shipwreck?

But, says one of the older members of the profession, we must be respectable and stick to and obey all the rules and regulations of the profession. The pro-patent men reply to this by stating that it has always been and will always be, that whenever intelligence increases and light grows stronger, and the leaders of men redouble their investigations, some old fogies will stand in the way, and, croaking at new innovations, will cry, "Stick to the old rules;" and the pro-patent men even go so far as to intimate that many of the rules are better honored in breach than in the observance. To the charge that patents produce monopolies, the pro-patent men reply, there is not an artisan, manufacturer or producer of any kind in all this happy land, who does not directly or indirectly pay tribute to somebody's patent monopoly, and it is such a help to them all that they hail each new invention, in spite of its attendant monopoly, as a new harbinger of their own success.

Compare the plodding, drudging farmer of fifty years ago, with all his hard work, awkward shifts, and miserable results, with the independent, intelligent farmer of to-day. He has the good sense to pay the tribute required by patent monopolies, but what has it done for him? Emancipated him from one-half of his toil and drudgery, and his products are better and more cheaply obtained. We are compelled to go to him to buy our food, and he, because he pays tribute to a patent monopoly, can sell it cheaper; thus we are all benefitted by a patent monopoly. A similar state of facts will be found in every department of labor, manufacture and production.

Then, if patent monopolies have produced these beneficial results, how can they be odious? The pro-patent men triumphantly assert that there is not one of all the material comforts which sweeten and make life more pleasant, that we do not owe in some measure to patent monopolies. They further ask, since they have shown you what a brilliant, beneficient success patents have been in every other branch of life, what reason can you allege why they will not work well in the dental profession?

All these arguments, objections and questions are very aggravating, but they are like Banquo's ghost, they "will not down." They are pressing upon us from every side and demand an answer.

What shall we say? I feel myself entirely incompetent to reply, but hope in the near future my brethern will make such answer as will redound to the strength and honor of the profession, the good of humanity, and the interests of all concerned.—*The Record, N. Y. C. D.*

OVER-MEDICATION.—In treating alveolar abscesses, we may have too much of a good thing. In pumping carbolic acid, peroxide of hydrogen, bichloride of mercury, etc., into alveolar abscesses, periods of rest ought to be allowed, or only warm water substituted.

EDITORIAL.

SALUTATORY.

Amid the sweltering heat of mid-summer, with the mercury mostly in the nineties, and the turmoil and clamor of stikes, the *travail* in the birth of our anticipated hopeful, has scarcely been equal to our anxiety and ambition to appear full-fledged in our modest bow to our readers and the journalistic world. Yet conscious of our defects and short-comings, we take comfort and consolation in the old adage, "Never an oak without there having been an acorn." The *conception* of the mission to be wrought in the scientific world, was the occasion of the *conception* of the journal now christened The Dental and Surgical Microcosm. To the best of our knowledge this is the *only* journal in the world devoted *chiefly* to the *Science of Anæsthesia, Anæsthetics and Surgery* in their co-operative relations in relieving suffering humanity, promoting health and saving life.

The aim will be to furnish the most advanced thoughts and developments in this chosen field of literature and science, and to this end, afford free and open discussion of the great truths and principles that pertain to these sciences ; and in this work, to be recognized as belonging to no school of physic, nor wing of the dental profession, independent and aggressive, and yet, conservative, conciliatory and promotive of the best interests of all, so far as relates to their advancement in the science of anæsthesia and surgery. The Dental and Surgical Microcosm, while conceding that authority when right has done much to advance science and art by restraining the more ignorant and arrogant and directing investigations, properly recognizes that when in *error*, authority greatly retards by misleading in the development, and thus proves a barrier and curse rather than an an advantage. Therefore, it will not hesitate to expose and denounce error, whether found among the labyrinths of the numerous honored titles, and in high and important positions, or in the long roll of the more humble and less pretentious. With this object in view, we cordially solicit contributions from any and all who are well versed in these sciences and competent to write instructively.

The controlling editor, with his staff of able assistants, will spare no pains nor withhold no effort that may be necessary to make this journal worthy of its mission. And as the *ideal* and *realistic* are as necessarily connected as cause and effect, and as essential in existence the one as the other, the *ideal* journal, will ever be held in view, and all efforts will be concentrated on this defined line to make the *realistic* equal to the ideal. That this MICROCOSM may not only signify and represent the *ideal* but the realistic journal.

EDITORIAL REVIEW.

WE would respectfully request a careful and critical reading of Dr. Waterman's article, beginning on 1st page, on "The Effects of Anæsthetics upon the Human System as evidenced by Spectroscopic Observations," as it is one of the best and most valuable papers ever published on the subject. Then we would solicit the same careful reading of the address to the State Dental Association, of Indiana, by the Editor, on "The Science of Anæsthesia," beginning on page 14, that the reader may discover how far we answer the difficulties and objections to anæsthesia, which the Doctor presents, as well as to see to what extent and how beautifully our thoughts, proofs and instructions harmonize. Note particularly that there is no other way of estimating the effects of any drug upon the human system only as it may effect the nervous system and the circulation of the nervo-vital fluid, or animo-electricity, which directs and controls the functions of life ; that to understand the chemical composition or symbols of any drug, does not assist in acquiring a knowledge of the functions, chemical properties or chemical effects of the drug, as a fundamental law of chemistry, is that where any two or more chemical elements are chemically combined, they loose the properties and effects of any and all the elements entering into the combination. That a knowledge of any drug, must be acquired by experiencing or witnessing its effects, as they are produced through arterial and veinous circulation, or direct upon the great heart of the nervous system, or brain, thus controling neural circulation, and consequently the functions of life. The Doctor's spectroscopic observations, especially in the use of nitrous oxide gas, is of inestimable value to the honest searcher after knowledge. When he says that the insensibility produced by this gas is afforded during an interval of partial death, you will not question the veracity of the statement when you will have read carefully the entire article, as well as the article immediately following it. The articles referred to may consume more of your precious time than you at first thought may care to give, but if it be light that you are seeking, don't pass them by or give them a cursory reading, but diligently, carefully and studiously read and reflect.

The Editor of The Microcosm would say to those applying for his services to lecture to Medical and Dental Associations and Schools that, as there is a pressing demand for his services, and that as many have felt disappointed and seemingly not well pleased that their requests were not granted, he would say, make your application in *due time* and your chance for his services, is all the more favorable. The rule, all things else being equal, first call, first served.

The Publishers, after examining the best half-toned photo-electrotypes, as well as the best wood-cuts obtainable, of Drs. Koch and Pasture, decided to use the wood cuts as the most perfect and best representation of the eminent Bacteriologists. As the teachings and discoveries of these men, will be frequently refered to in our Journal, we thought it befitting, that our readers may become acquainted with their physiognomy.

It is very important to the reader, that he have consecutive numbers of the Microcosm, that he may keep himself read up on the advanced thoughts, hence your subscription should be sent in *at once*, that you may have the entire volume. This may be of great importance to you in the future for reference.

The Publishers of Journals to whom we send The D. & S. Microcosm will greatly oblige by putting our Journal on the exchange list.

CHEMISTRY, PHYSIOLOGY AND PATHOLOGY OF NITROUS OXIDE—PRACTICAL POINTS, WITH COMMENTS BY THE EDITOR.

GASEOUS INTERCHANGE.

And, first, as to the effects produced by the inhalation upon the gases contained in the lungs and blood, and for which I have used the term "gaseous interchange."

1. That the expired gas tends to become precisely similar in composition to that inspired, so that, *prima facie*, one would be justified in concluding that no very active decomposition of the gas occurs; and this conclusion is further justified by the researches of Hermann and other observers.

2. That the carbonic acid, instead of being increased in quantity, as is the case in aerial expirations, is rapidly and continuously diminished.

3. That the amount of oxygen is diminished and, in fact, almost entirely disappears.

4. That, as might be expected from the fact, the nitrogen does not take any very active part in the physiological functions, even under ordinary circumstances; in gaseous inhalation, it is removed by diffusion alone, and hence very slowly.

5. That the substitution of nitrous oxide for the other gases does not take place at all equally or proportionately, but mainly at the expense of the oxygen, which is rapidly reduced.

Dr. Amory's experiments upon himself and upon dogs have very much the same result, but were carried somewhat further. He found that the relative amount of carbonic acid inhaled during fifty respirations of the gas was only about half of that found in the same number of aerial respirations.

CONCLUSIONS.

1. That the progressive loss of carbonic acid in the expired gas is not associated with any accumulation in the blood, and must, therefore, be due either to lessened production in the tissues or to defective absorption by the blood.

2. Now, in order that carbonic acid may be produced, free oxygen, or an agent capable of yielding free oxygen, must be

present. But we see that free oxygen is displaced by nitrous oxide, and we know that the latter undergoes no decomposition in the blood.

3. Hence, during inhalation, the process of tissue metabolism and the production of free carbonic acid is in obeyance.

PULSE TRACINGS.

A comparison of the pulse trace taken from an average healthy individual during the height of anæsthesia, with one taken from the same individual immediately prior to inhalation, shows :

1. An actual increase in the number of heart beats.
2. The greater height of the stroke.
3. The greater sharpness of the initial curve and apices.
4. The almost complete absence of the tidal wave.
5. The accentuation of the dicrotic wave, which is at the same time removed further from the apex of the trace.

I think we may gather from the consideration of these tracings alone (1) that the heart's action is accelerated and slightly increased in force ; (2) that the blood pressure is lowered ; and this latter point has been proved by actual experiments.

CAUSES OF DEATH.

1. That when death has occurred it has been due either to syncope or asphyxia.

2. Simple faintness may occur either before the inhalation is complete, apparently from fright, or during the stage of recovery, apparently from the shock of the operation.

3. Fatal syncope has, with very few exceptions, been distinctly traceable to the shock, consequent upon commencing or continuing the operation when the anæsthesia was incomplete, and have, as may readily be imagined, occurred in patients more or less out of health.

4. Hence the importance of never permitting any operation in a semi-anæsthetical condition.

5. The occurrence of asphyxia from laryngeal spasm, or from falling together of the epiglottidean folds, as in chloroform, has not been recorded with regard to nitrous oxide, and does not seem likely to give rise to any trouble. Such a condition, if it does occur, is, of course, to be looked for during the height of anæsthesia.

6. Fatal asphyxia has invariably been the result of some mechanical cause, *e. g.*, regurgitation of vomited matter, slipping of tooth or gag into the larynx, and has therefore usually occurred during or immediately after the completion of the operation.

7. Hence the importance of watching the mouth, as well as the face, during the stage of recovery.

SYNCOPE.

Recognized by—Sudden dilation of pupil, extreme pallor, heart failure, muscular relaxation, feebleness of breathing.

Treatment.—Prone position, draw out the tongue; artificial respiration.

ASPHYXIA.

Recognized by—Increasing duskiness, violent efforts at respiration, gradual failure of pulse.

Treatment.—Remove foreign bodies (inversion), or draw the tongue *well* forward, press on the chest, wipe out mucous; laryngotomy followed by artificial respiration.—Silk, *Dental Record.*

In the above article from the *Dental Record* it will be observed that the author fails to recognize the true and *only cause* of asphyxia, and appears to be surprised at the effects as noted during the administration of nitrous oxide gas and hence fails to account for the facts as noted. If he will concede the fundamental truth that asphyxia can only be produced by withholding the free oxygen or by robbing the blood of its due oxygenation, and then use the word asphyxia where he uses the word anæsthesia, he will not find it difficult to account for the results as noted. Nitrous oxide gas is a chemical combination of $N^2 O$ and not a mixture as is the atmosphere. The oxygen cannot be free until sufficient heat be applied to decompose the two chemical elements. There is not sufficient heat in an animal to decompose the two elements; therefore the nitrous oxide enters the blood as nitrous oxide and is eliminated as such, and consequently not a particle of free oxygen, is imparted to oxygenate the blood or to sustain life. This explains his first notation that "the expired gas is precisely similar in composition to that inspired," which he states is further justified by the researches of Hermann and other observers. It also explains his second notation that "the carbonic acid, instead of being increased in quantity, as is the case in ærial expirations is rapidly and continuously diminished.'' This must *necessarily* be the case, as free oxygen is the supporter of combustion, and in the administration of nitrous oxide gas the free oxygen is crowded out or withheld, and consequently there must be less carbonic acid evolved. Also, 3d, 4th and 5th notations are in perfect harmony with these laws of nature.

In regard to the pulse tracings as noted, the author seems not to recognize the true cause of the variations in the character and number of strokes or beats of the heart. The neural current in the vasso motor nerves extending into the muscles concerned in the functions of the heart control their action, and the mind influences the neural current. Therefore, the actual increase in the number of heart beats as well as their greater height of the stroke, etc., is due to the excited condition of the mind. If the patient be excited from fear, or struggling for the *force of life*—free oxygen—the pulse will be quick and *forcible* until weakened by robbing the blood of its due oxygenation, so that the cerebral glands cannot generate sufficient animo-electricity or nervo-vital fluid to sustain the action of the heart, and then the tidal wave diminishes, and death is the result, when the asphyxia is carried so far and complete that the *affinity* of the blood for *free oxygen*, has so weakened that it fails to take up the oxygen from the atmosphere. When the patient has once crossed that "dead line,'' then all the powers and efforts of earth cannot resuscitate the patient.—[ED.

CLOSING DOOR OF QUACKERY.

Since the organization of the first State government on American soil the door of quackery has stood open, and the ignorant and poor have been at the mercy of designing and unscrupulous men calling themselves doctors. The first laws passed in this country were too rigid, as a rule, and could not be enforced, and scarcely anything was done to protect the health, lives, and property of the people against these people until fifteen years ago. Forty-one States and territories now have laws in regard to the regulations of the practice of medicine, forty of these laws having passed since January 1, 1875. Some of these laws are now inoperative, and, if operative, would be inefficient. The states that have no laws for regulating the practice of medicine are Kansas, Maine, Massachusetts, Rhode Island; Utah has no law, and the Creek Nation, in the Indian Territory, has no law. The existing laws are entirely or practically inoperative in Arkansas, the District of Columbia, Maryland, Ohio and Texas.

In many of the States and territories the law requires a person wishing to practice medicine to register his diploma in a county clerk's office. Such a law is obviously inefficient, because a fraudulent diploma can be registered under it. So with regard to laws requiring that the diploma recorded shall be that of a "legally-chartered" medical college. Some of the worst and most fraudulent colleges that have existed in this country were "legally chartered." Twenty-three States and territories now have efficient laws under which the State Board of Health or the State Board or Boards of Medical Examiners (1) give certificates on diplomas of medical colleges "in good standing," or examine applicants that have not such diplomas. Of these laws eight were passed in 1889 and 1890.

The total number of medical colleges embraced in the new Illinois board is 316, of which there are or have been in the United States 294 and in Canada twenty-two. Of the 316, the total of the extinct schools is 168, of which 159 were in the United States and nine in Canada. There are now 135 medical schools in the United States and thirteen in Canada. Of the 159 extinct schools of the United States twenty-three were fraudulent. There are now in existence twelve colleges or institutions known to be fraudulent—simply diploma mills. One each of these is in New Hampshire, New Jersey and Washington, two in New York, three in Vermont, and four in Ohio; and there is another in Ohio that may as well be classed as fraudulent.

In the past ten years the duration of the annual lecture terms, has been extended from 23.5 weeks to 26.3 weeks, and the number of schools having sessions for six months or more has increased from forty-two to 111. In the same time the percentage of graduates to matriculates has fallen in the United States from 32.7 to 31. In Canada this percentage is 23 for 1890, the highest for ten years. With the session of 1882-83 the Illinois schedule of minimum requirements went into effect, and the number of matriculates in this country was immediately diminished. In 1881-82 the number was 12,452; it went steadily down to 10,987 in 1884-85, when it began to rise again, and in 1889-90 it was 14,884.

It is a noticible fact that the loss of students when the Illinois schedule went into effect was, as a rule, felt more severly by the schools having low standards of entrance and graduation. Before the session of 1883-84 there were but forty-five medical colleges in this country that exacted educational qualifications as a requirement for matriculation; now there are 129. Before 1883-84 twenty-two colleges required attendance on three or more courses of lectures; the number is now eighty-five.

In the near future the figures will be still better. So many colleges have made provision for three courses of lectures, that there are now but twenty-one colleges that require only two courses and have made no provision for longer study. It may be predicted that in five years every college in this country will have adopted the requirement of four years' study and three courses of lectures. What has been done is the result, mainly of the work of the various examining boards, which now control the recognition of diplomas in an area containing about 41,000,000 people. A further impetus has been given by the rules adopted by the American Medical College Association, the National Electic Medical Association, and the National Institute of Homœopathy in regard to the time and subjects of medical education and regard to preliminary education. The Chicago Medical College was the first medical institution in the United States to adopt the three years' graded course for the study of medicine; this action was taken on June 4, 1868.

HIGHER MEDICAL EDUCATION.—At the meeting of the Board of Trustees of the University of Pennsylvania, held May 21st, Dr. Pepper made an offer of $50,000 towards an endowment fund of $250,000, and of $1,000, annually towards a guarantee fund of $20,000 annually, for five years, conditioned upon the establishment of an obligatory graded four-year course of medical study. This was accompanied by a communication from the Medical Faculty, pledging themselves to carry out this proposal, and to enter upon the four-year course in September, 1893. It was also reported that the members of the Medical Faculty, had themselves subscribed $10,000 annually for five years to the endowment fund. The Board of Trustees expressed warm approval of the proposed advance in medical education, but postponed their assent until the success of both funds had been demonstrated.—*The Head Light.*

OUR DENTAL COLLEGES.

GRADUATES AND MATRICULATES.

	No. of last Session	Graduates.	Matriculates.
Philadelphia	28th	146	315
Pennsylvania	35th	94	251
New York	25th	86	282
Baltimore	51st	76	224
Ohio	45th	75	210
American	5th	49	70
Kansas City	9th	43	107
Indiana	12th	40	96
Missouri	25th	26	90
German-American	2d	11	22
United States	1st	11	41
Western	1st	9	62
North Western	8th	6	30
Lake Forest University......Dental Department	9th	98	323
University of Cincinnati..... " "	45th	75	210
University of Maryland...... " "	9th	64	163
University of Pennsylvania .. " "	......	83	206
University of Iowa.......... " "	8th	58	161
Vanderbilt University........ " "	12th	44	135
Southern Medical College.... " "	4th	38	105
Tenn. Medical College....... " "	2d	7	18
Central Tenn. Maharry...... " "	5th	5	1
Columbian University....... " "	4th	2	19
Howard U., Washington, D. C. " "	......	2	......
University Dental College, Chicago, Ill.	......	4	......
University of Denver, Denver, Col., Col. of Dentistry	......	5	13
Western Dental College, Kansas City Mo	......	9	62
Royal College of Dental Surgeons, Ontario, Canada	......	27	68
Southern Medical College, Atlanta, Ga., Dental Dept	......	38	105
Baltimore College Dental Surgery, Baltimore, Md	......	76	224
Chicago College Dental Surgery, Chicago	......	94	323
		1,401	3,928

TREATMENT OF HEMORRHAGE AFTER TOOTH EXTRACTION.

We come now to the all-important question of the immediate treatment of the cases under consideration. It is unnecessary for me to trouble you with any thoughts or suggestions as to ultimate or constitutional treatment. It will be most profitable to consider how best at the moment the dentist can stop the flow of blood and let his patient depart from his care quite secure. It will be inferred that in the cases already commented on, various remedies have been adopted, and I am sure that I must have seen twenty or more tried with more or less of success. My desire is to name the simplest and the best in the short time still at my disposal. In my early practice, on being summoned to a case, my instant attempt was to stem the flow of blood, without inquiring too minutely what was the cause of the accident. Bye-and-bye I found that there was rarely any great reason for hurry; that it would take a long time for a person to die from the loss of blood and that faintness was not such an anxiety as some make of it, but rather assisted the action of remedies, because it relieved the tension of the circulation, and made it easier to manipulate on the point from which the hemorrhage proceeded. Gradually I found certain reliable steps, which I now follow, and which I think should always be followed.

In the first place, it is essential to ascertain if the blood that is being lost is not coagulable. If the blood is coagulable—if a little of it caught in a cup or glass goes into a firm clot in the course of two or three minutes—much cause for alarm is removed, and the line of treatment is sufficiently clear. We may be sure in such a case that the cause is either vascular or mechanical, that there is failure in the contraction of the bleeding vessels, or adhesion of the vessel to the surrounding bone tissue, or rupture of an abnormally large vessel. Whichever it may be, there is the assurance at hand that the blood is in a favorable condition for forming a plug, and that if it can be retained in the cavity a sufficient time to enable it to form a firm clot it will produce a natural arrest. I shall deal with this simple treatment first.

TREATMENT OF VASCULAR AND MECHANICAL HEMORRHAGE.

This treatment includes three methods: (1) The styptic; (2) the plug with pressure, with or without styptic; (3) the cautery. In the beginning of my practice I trusted mainly to styptics in this class of case, and after many trials, I came to the conclusion that nitric acid was the best. I believe still, that as a styptic it is the best, but it has the disadvantage of being very difficult to manipulate with, owing to its extreme caustic and destructive properties. I afterwards invented styptic colloid, which is composed of tannin in collodion, with addition of tincture of benzoin; and for ordinary cases, I do not know of a better. The colloid can be applied on cotton wool, and a firm plug of it, can be inserted with much facility. When this did not seem sufficient, I resorted to perchloride of iron, applied in a solution with cotton wool. It has often happened that these simple methods have proved effective. When they have not, I have proceeded to the second plan, that of the plug with pressure.

Three kinds of plugs have heen used. One is made of soft, well-teased cotton wool saturated with styptic colloid. The mass is not put in in too moist a form, but, mixed in a cup, is allowed to dry slightly by the evaporation of the ether. Then, after well drying the bleeding cavity with a pledget of lint, the colloid cotton is inserted with forceps, the point of which, has been dipped in olive oil, layer by layer, as in a process of roughly stopping a tooth, until the cavity is completely filled. A little bit of dry wool is next made to cap the whole, and pressure is next made with the finger or with Harding's compress until the plug is solid, which, owing to the escape of ether, is rather a quick process.

A second plan is to use perchloride of iron plug, made by saturating cotton wool with solution of perchloride of iron, and then drying the cotton down. Cotton so prepared can be kept in bottles ready for use, and can be applied as a plug in a similar manner as the colloid. I have also constructed what may be called the *wick styptic*, and this is very useful in minor cases. It consists of a glass tube having a narrow point, through which is drawn a piece of cotton wick saturated with perchloride. A portion of the wick projecting from the narrow end of the tube can easily be inserted and firmly held in the cavity; when it becomes saturated with blood it can be cut off, a new bit pulled out and a fresh application made.

The best plug of all, I have been able to construct, is a gutta-percha styptic plug. It is very convenient, and is easily kept at hand for an emergency as a disc. The discs here named consist of gutta-percha saturated with a styptic, tannin or perchloride of iron. One of these discs, picked up by the forceps and held for a short time in hot water, softens and become so malleable that it can be inserted into any cavity. The bleeding tooth cavity is quickly dried with absorbent cotton wool, and is then filled with the plastic styptic, pressed firmly down to the bottom and held there until it becomes firm. There is no fear of putting in the plastic styptic too hot, since heat favors coagulation. I have placed a few of these styptic discs before the society, this being the first time on which, I have brought them into notice.

TREATMENT OF PURPURIC HEMORRHAGE.

The lines of treatment above named are required for cases of mechanical hemorrhage, in which the blood is naturally coagulable. I therefore pass at once to consider the management of those more serious accidents in which the blood is deficient in plastic quality. I need not dwell long on this matter, because my mind is made up in regard to treatment. Presuming that the blood flowing from the injured part shows no tendency to clot and is discharged in a steady stream, which is not arrested by pressure or the ordinary application of styptic, it is necessary at once to produce secondary or albuminoid coagulation. It must be remembered that no blood is so constituted that it cannot be made to coagulate. In the most fluid blood there is albumen, which will not become solid spontaneously, but can be solidified by various means we have at hand, namely, tannin, perchloride of iron, and the subdued actual cautery. It may be well always to try the two first-named styptics, and in the perchloride percha styptic and the percha tannin styptic, to some extent, we have substances which will coagulate albumen, even when they are not heated, and will instantly coagulate albumen, if heated to 140° Fahr. These, therefore, are very ready in emergency. If they fail, no time should be lost in resorting at once to the cautery. When the electric cautery is at hand it is the most convenient; it does not alarm the patient, and the heat of the terminal probe is sustained in the cavity; but if the electric cautery be not at hand, the next best is the small iron cautery, an iron bulb terminating in a rounded point and fixed in a strong handle at an oblique angle. This bulb and point can be made red-hot in the flame of a spirit lamp or of a gas jet. But it is not necessary to alarm the patient by using it while it is in a state of glow. It may be allowed to cool down until all redness has disappeared, and can then be inserted deep down into the bleeding cavity. Skillfully used, it gives no pain of moment and its effect is, as a rule, immediate in the arrest of blood. Should it fail, there is no other direct local measure that can be depended upon. Even ligature of the carotid, if the case should come into the hands of a surgeon, would be a doubtful measure, since hemorrhage from the surgical wound might be uncontrollable and simply add to the danger. Happily, for my part, the danger has only once pressed to the extent of suggesting so extreme a measure, and then the hemorrhage was stopped by the cautery and did not return. In other cases, four in number, the cautery has acted at once. It is a remedy applied with unusual readiness if the idea of fear of it be not exaggerated. It should never be used at such a heat as to destroy structure. The coagulating power of heat over albumen, vis., 140° F., is all that is required strictly, but this may be safely exceeded to 150 or 160 degrees.

Before I conclude, there are two other topics to which I must call attention. It is customary, when the accident of hemorrhage occurs, for the operator, or some bystander, to administer wine, brandy or some other alcoholic stimulant to the patient, under the false idea of sustaining the vital power. It is my solemn duty to protest against this practice on the strictest and purest scientific grounds. The action of alcohol, under such circumstances, is injurious all round. It excites the patient and renders him or her nervous or restless. It relaxes the arteries and favors the escape of blood through their divided coats. Entering the circulation in a diluted state, it acts after the manner of a salt in destroying the coagulating quality of the blood ; and above all other mischiefs, it increases the action of the heart, stimulating it to throw out more blood through the divided channels. These are all serious mischiefs, but the last named is the worst. In hemorrhage the very keystone of success lies so much in quietness of circulation, that actual failure of the heart, up to faintness, is an advantage ; it brings the blood at the bleeding point to a standstill, enables it to clot firmly, when it has that tendency, and so to form the most effective possible check upon the flow from the vessels. In the case I spoke of in which I removed the hard palate, the quantity of blood lost during the hemorrhage amounted to over three pounds weight, and the syncope was so extreme that the patient did not know that anything had been done to him after he returned to consciousness. But not a drop of any stimulant was administered him at any stage, and the care to avoid any such administration was carefully sustained after recovery, in order that the rapid action of the heart might not overcome the resistance of the tenderly sealed up vessels. Indeed, I am certain that this rule of avoiding stimulation was far more effective in saving my patient's life than any surgical skill of mine, for the vessel I twisted might have become plugged up naturally during the syncope, but nothing would have prevented the bleeding from breaking out afresh if the heart, instead or being allowed to swing round of itself slowly and safely, had been whipped, for a brief period, into violent action. I refer to this case as typical, because if a stimulant was not wanted in it a stimulant cannot be called for in examples less severe. The course followed in that case was to lay the patient quite recumbent when signs of faintness supervened, and so long as he could swallow to feed him with warm milk and water freely. This, in my opinion, is the proper treatment to be employed in every instance of syncope from loss of blood.

The second concluding topic has relation to the effect of blood swallowed by patients who are bleeding from the mouth. In all bad cases of hemorrhage from the mouth some blood is almost of necessity swallowed. The act sometimes gives cause for undue alarm, and it invariably alarms the patient. At first I was a prey to some alarm on this score, but experience has shown that anxiety is groundless. The fact of a person swallowing a good many ounces of blood is not necessarily injurious. The blood is digested and re-assimilated if it be not carried into the stomach in too large a quantity. When it is carried in in too large a quantity it is usually vomited, with a return of faintness, from which, however, I have never observed any serious danger nor recurrence of bleeding, if that has been thoroughly staunched.

There are some other points of after-treatment of hemorrhage, particularly in examples of the purpuric type. But as such treatment is mainly constitutional in character, and calls for internal remedies, it belongs to the physician and need not be insisted on in an essay which relates exclusively to the art of tiding over danger in the operating room and from one particular class of operation.

SUMMARY.

In summary, the leading points that I put forward, are that hemorrhage from tooth extraction is due to one of three sets of causes: (1) To purpuric or fluid blood of which there are two varieties, (*a*) the aqueous, (*b*) the saline, (2) the vascular weakness or paresis of artery, occurring in constitutions, (*a*) strumous or scrofulous, (*b*) anæmic, (*c*) alcoholic, (*d*) syphilitic. (3) To mechanical lesion, the result of extensive mechanical injury.

In the treatment of hemorrhage of the second and third classes, styptic treatment with pressure is that most immediately useful, the best styptics being tannin and perchloride of iron, either of which may be applied by means of the styptic gutta-percha disc. In the treatment of vascular hemorrhage, secondary or albuminoid coagulation must be induced, for which the subdued actual cautery is necessary. In all cases alcoholic stimulation is inadvisable, and the fact of blood being swallowed need not afford cause for anxiety.—*Benjamin Ward Richardson, in British Journal of Dental Science.*

APHORISMS.

A RUBBER layer sandwiched in the sole of the shoe is said to prevent wet feet.—*Scientific American.*

NEW SURGICAL DISCOVERY.—Professor Sittig, of Strasburg, has made the important discovery that pyoctanin, an aniline derivate, is an absolute destroyer of pus in any quantity. This new medicine is looked upon as the ideal curer of wounds, suppurations ulcers and skin affections, and is totally harmless. It is highly diffusible, and has an immense sphere of utility. Taken internally, it is a remedy notably for pleurisy and peritonitis. Professor Merck, of Darmstadt, has prepared all his surgical dressing material with this new discovery.—*Dalziel.*

SPICE BOX.

AN Exchange remarks that the standing resolutions of the National Assembly of Dental Examiners, "are like too much hair on a dog's tail." They should be "incorporated." If there is danger from the too much hair—of the tail-wagging the dog—it might be better to cut it off.—[ED.

"GOOD, kind-hearted soul that she was," said Job Shuttle as he mused on the excellencies of his better-half, long since passed away. "If I don't meet that woman in heaven, I hope I shall miss her in the other place, that's all?"

A GIRL had her corset torn off by a stroke of lightning, and escaped, but her young man had his right arm shattered and a piece of corset steel blown into his liver. He didn't know she was loaded.

UNCLE JOE tells of a dentist who tried to file the teeth of a buzz saw. He says, the coroner pronounced the operation a success.

A LOAFER is a two-legged brute, with more stomach than head.

LIFE is true, life is real, and the man is stupid, who wastes one hour of it.

"TEETH pulled while you wait," is the flaunting sign of a New Hampshire dentist.

WHY is a baby like wheat? Because it has to be cradled, bundled and thrashed, and then "becomes the flower in the family."

A DENTIST tried hard to collect a bill, but after many ineffectual efforts said to the debtor: "I do not intend to send you any more bills, and I don't intend to sue you; but there is one thing I want to tell you. Every time you cut off a piece of beefsteak and pass it to your wife, I want you to remember that she is not chewing that beef with her teeth, nor with your teeth, but with my teeth." In two or three days he received a check. The motion of those doubly-false teeth in his wife's mouth was too much for him.

MEMORANDA.

CALIFORNIA STATE DENTAL ASSOCIATION.

The twenty-second annual session will be held in San Francisco at Palace Hotel, commencing on the third Tuesday in July, 1891, at 10 o'clock A. M., and continue four days.

NOTICE.

The Minnesota State Dental Association will hold its regular annual meeting July 8, 9 and 10, in St. Paul.

L. D. LEONARD, Secretary,
73 Syndicate Blk., Minneapolis.

WISCONSIN STATE DENTAL SOCIETY.

The above named association will hold its twenty-first annual session at Eau Claire, Wis., from July 21st to 24th inclusive. A cordial invitation is extended to all dentists.

CLAUDE A. SOUTHWELL, D. D. S., Secretary.

A NEW ANTISEPTIC.

Microcidine is composed of 75 per cent. of Naphthalate of Sodium and 25 per cent. of Naphthol and Phenyl compounds. Soluble in three parts of water. Not injurious to instruments. Ten times more powerful than carbolic acid and twenty times more potent than boracic acid.

ILLINOIS STATE DENTAL SOCIETY.

At the twenty-seventh annual meeting of the Illinois State Dental Society held at Bloomington, May 12-15, 1891, the following officers were elected for the ensuing year: President, W. H. Taggart, Freeport; Vice President, Garrett Newkirk, Chicago; Secretary, Louis Ottofy, Chicago; Treasurer, W. A. Stevens, Chicago; Librarian, F. H. McIntosh, Bloomington. The next meeting will be held in Springfield, beginning on the second Tuesday in May, 1892.

LOUIS OTTOFY, Secretary.

The Post-graduate Dental Association. of the United States, was incorporated in Illinois last month, without capital stock, for scientific and social purposes. Incorporators, H. H. Wilson, D. C. Bacon, T. A. Broadbent, L. S. Tenney and R. B. Tuller.

Dr. J. C. Culbertson, formerly editor of the *Cincinnatti Lancet and Clinic*, is the new editor of the *Journal of the American Medical Association.*

Dr. J. Taft is chairman of the section on dental and oral surgery for 1891-92 of A. M. A., and Dr. E. S. Talbot is secretary. Detroit will be the next place of meeting, the first Tuesday in June.

Dr. Thos. Gaddes, formerly dean of the National Dental College, of London, England, has been elected dean of the Department of Dentistry of the University of Denver, Colorado. The University is to be congratulated.

MASSACHUSETTS DENTAL SOCIETY.

The twenty-sixth annual meeting of the above society will be held on Thursday and Friday, July 9th and 10th, 1891, at the Natural History building. corner of Boylston and Berkeley streets, Boston. Full programmes will be sent later. Please mark off *now* the dates on your appointment books and endeavor to attend. Members of the profession are invited to attend.

EDGAR O. KINSMAN, D. D. S., Secretary,
15 Brattle St, Cambridge, Mass.

AMERICAN DENTAL ASSOCIATION.

OFFICERS.—President, A. W. Harlan, Chicago, Ill.; First Vice President, J. D. Patterson, Kansas City, Mo.; Second Vice President, H. B. Noble, Washington, D. C.; Recording Secretary, Geo. H. Cushing, Chicago, Ill.; Corresponding Secretary, Fred H. Levy, Orange, N. J.; Treasurer, A. H. Fuller, St. Louis, Mo. Place of meeting, 1891, Saratoga Springs, N. Y., Tuesday, August 4th.

SOUTHERN DENTAL ASSOCIATION.

President, G. F. S. Wright, Georgetown, S. C.; First Vice President, R. K. Luckie, Holly Springs, Miss.; Second Vice President, W. H. Richards, Knoxville, Tenn.; Recording Secretary, M. C. Marshall, Little Rock, Ark.; Corresponding Secretary, D. R. Stubblefield, Nashville, Tenn.; Treasurer, V. E. Turner, Raleigh, N. C. Place of meeting, 1891, Morehead City, N. C., Tuesday, August 11th.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

The eighth annual meeting of the National Association of Dental Faculties will be held at Saratoga Springs, N. Y., on Saturday, August 1, 1891, at 10 o'clock, A. M.

Applications for membership must be in the hands of the Executive Committee, Dr. J. Taft, Chairman, 60 days prior to the meeting.

Each delegate must be a member of the teaching faculty in the college he represents, and bring a certificate signed by the president (or dean) and secretary, stating that he is authorized to act for them.

Delegates must be in attendance promptly at 10 A. M. on the day of meeting, in order that all the business may be concluded before the meeting of the American Dental Association, August 4th.

J. D. PATTERSON, Secretary,
Keith and Perry Building, Kansas City, Mo.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The National Association of Boards of Dental Examiners will hold its annual meeting at Saratoga Springs, N. Y., on Monday, August 3, 1891, at 10 A. M.

It is important that the board of every State in the Union, that has a law regulating the practice of dentistry, be as fully represented as possible. This association has immense responsibility, and it ought to have the benefit of the wisest and most discreet counsel possible. It is hoped every board having membership in this body will be represented, and that those that have not yet become members will certainly do so at this meeting. Matters of great interest and importance will come before the meeting.

J. H. MARTINDALE, Secretary,
Masonic Temple, Minneapolis, Minn.

IN MEMORIAM.

"I charge you that this epistle be read."

Dr. B. R. Tabor, of Bowling Green, a prominent dentist in Northwestern Ohio, died April 27, 1891, and was buried with the Scottish Rite by a large delegation of the Masonic fraternity, who came down from Toledo. The ritual as gone through with, was deeply impressive.

W. H. Atkinson, M. D. D. D. S., of New York, who lived and worked for the advancement of the dental profession, was well and favorably known and highly honored by the profession at large, esteemed as a brilliant and fluent speaker and as a kind, benevolent and affectionate brother, passed recently to a higher life. Though we shall miss him at our Dental Associations and mourn our loss to the profession and humanity, yet he ever liveth and we may hope to join him on the other shore.—ED.

At the meeting of the Chicago Dental Society, Tuesday evening, May 5, 1891, the following resolutions on his death were adopted:

WHEREAS, The Chicago Dental Society having learned of the death of Dr. Wm. H. Atkinson, of New York, one of the most eminent, learned and best known members of the dental profession; therefore, be it

Resolved, That in the death of Dr. Atkinson the members of this Society feel a sense of personal bereavement in the loss of a much loved and conspicuously useful member of the profession, and while we bow in humble submission to the Divine will, we desire to express our sorrow in his final exit to the unknown land beyond this world of ours; be it further

Resolvod, That the Secretary transmit to the bereaved family of Dr. Atkinson a copy of these resolutions and that a copy be furnished the dental journals for publication.

J. U. Crouse,
A. W. Harlan,
W. W. Allport,
Committee.

RESOLUTIONS ON THE DEATH OF DR. E. B. WARD.

When death claims a man like Dr. E. B. Ward, it is a loss to the world, a misfortune to his profession, and a calamity to those who knew him best. He had not reached the point in life where time and attainment mark the summit. His face was turned toward the heights, and on his brow there beamed the star of hope. In the day dream of life he was yet in the morning and the future held for him the promise of a brighter hour. But he has fallen by the wayside and we, his friends, can only grieve that he has gone, and place a tribute to his memory among the records of the society which claimed him as an honored member. We wish to express our appreciation of his many virtues, our bereavement at his untimely departure and our sincere sympathy with his family and friends.

J. A. Swasey,
Edmund Noyes,
C. N. Johnson,
Committee of the Chicago Dental Society.

Dr. James W. White, ex-President of the Department of Charities and Correction, died suddenly at 7 o'clock yesterday morning, at his residence, No. 2012 Green street. He was just getting out of bed, when he was taken with a stroke of apoplexy, and falling to the floor, instantly expired. To all appearances he was in his usual health on Tuesday.—*Philadelphia Ledger*.

At a meeting of the Chicago Dental Society, Dr. Allport offered the following resolutions in regard to the death of Dr. James W. White, of Philadelphia:

Whereas, It hath pleased the Creator and final disposer of all things to remove from this world Dr. James W. White, of Philadelphia, and

Whereas, It is fitting that this Society should make some record of its appreciation of his virtues and of his useful life, therefore

Resolved, That in the death of Dr. White, dental journalism has lost its ablest editor, the business world a member of sterling integrity, the unfortunate and needy a practical philanthropist and the church an exemplar of the nobitity of a liberal Christian religion.

Resolved, That in their affliction we extend to his bereaved family our sincere sympathy, and with reverent humility we commend them to Him who has promised to be "the friend of the widow and the fatherless," and "a real present help in time of trouble."

Resolved, That a copy of these resolutions be transmitted to the family of the deceased, and sent to the *Dental Cosmos*, *The Dental Review*, and other dental journals for publication.

Carried.

DIRECTORY OF DENTAL SOCIETIES.

American Dental Association—Meets on the first Tuesday of August, 1891, at Saratoga. Pres., A. W. Harlan, Rec. Sec., Geo. H. Cushing, Chicago.

Southern Dental Association—Meets in Moorehead City, N. C., on the 11th of August, 1891. Pres., G. F. S. Wright, S. Carolina; Secretary, M. C. Marshall, Little Rock, Ark.

STATE DENTAL SOCIETIES.

California State Dental Association—Third Tuesday in July, 1891. Pres., F. W. Bliss; Rec. Sec., W. A. Knowles, San Francisco; Cor. Sec., L. Van Orden. Next meeting in San Francisco.

Connecticut State Dental Society—Pres., E. A. Stebbins, Shelburne Falls; Rec. Sec., G. Maxfield, Holyoke. Annual meeting Oct. 27th and 28th, 1891, at Hartford.

Dental Society of the State of Maryland and District of Columbia—Meets annually. Next meeting at Washington City, on the second Tuesday in October, 1891. Pres., B. F. Coy, of Baltimore; Sec., M. W. Foster, M. D.

Georgia State Dental Society—Meets second Tuesday in July, 1891, at Gainsvile; Pres., S. B. Garfield; Rec. Sec., C. A. Ryder; Cor. Sec., L. D. Carpenter, Atlanta.

Maine Dental Society—Pres., E. Bacon, Portland; Sec., C. E. Bryant, Pittsfield. Next meeting in Brunswick, on the third Tuesday in July, 1891.

Maryland State Dental Association—Meets annually in December. Pres., J. Emory Scott; Rec. Sec., W. W. Dunbracco; Cor. Sec.

Mississippi State Dental Association—Meets July 18th, at Biloxi, 1891, during Camp Meeting. Pres., R. K. Luckie, Holly Springs; Sec., R. H. Hight, Grenada.

Minnesota State Society—Pres., M. G. Jenison, Minneapolis; Sec., L. D. Leonard, Minneapolis. Meets in Minneapolis, July 9th, 1891.

Missouri Dental Association—Meets at Louisiana, Mo., July 7th to 10th, inclusive, 1891. Pres., J. F. McWilliams, Mexico; Sec., John G. Harper, St. Louis.

New Jersey State Dental Society—Meets annually. Next meeting at Asbury Park, on the third Wednesday in July, 1891. Pres., G. E. Adams, S. Orange; Sec., C. A. Meeker, Newark.

New Hampshire Dental Society—Meets—Time to be decided. Pres., W. R. Blackstone, Manchester; Sec., E. B. Davis, Concord.

North Dakota Dental Society—Meets ———, 1891. Pres., I. J. Hill, Fargo; Sec., J. W. Cloes, Jamestown.

Ohio State Dental Society—Meets annually. Next meeting at Columbus, last Tuesday of October, 1891. Pres., E. G. Betty, Cincinnati; Sec., Otto Arnold, Columbus.

Pennsylvania State Dental Society—Meets second Tuesday of September, 1891, at Philadelphia; Pres., W. H. Roop, Philadelphia; Rec. and Cor. Sec., Th. F. Chupein, Philadelphia.

Rhode Island Dental Association—Pres., D. F. Keefe, Providence; Sec., W. H. Carpenter, Providence. Meets quarterly; second Tuesday in July, October, January and April. Annual meeting second Tuesday in July, at Providence.

South Carolina State Dental Association—Meets annually. Pres., L. S. Wolfe, Orangburg; Cor. Sec., E. C. Ridgell, Batesburg; Rec. Sec., R. A. Smith, Charleston. Next meeting at Greenville, third Tuesday in July, 1891.

Tennessee Dental Association—Meets annually. Next meeting at Columbia, first Tuesday in July, 1891. Pres., W. H. Morgan, Nashville; Rec. Sec., A. G. White, Springfield; Cor. Sec., E. G. Grant, Columbia.

Virginia State Dental Association—Meets in Charlottsville, Tuesday, August 19, 1891. Pres. J. Hall Moore; Sec., L. M. Cowarden, Richmond.

Wisconsin State Dental Society—Meets annually. Next meeting at Milwaukee, July 20, 1891. Pres., B. G. Marklein, Milwaukee; Sec., C. A. Southwell, Appleton, Wis.

LOCAL SOCIETIES.

Brooklyn Dental Society and Second District Society United—Meets quarterly. Pres., T. H. Holly; Rec. Sec., A. N. Russell, Brooklyn.

Central Dental Association of Northern New Jersey—Meets bi-monthly; and annually in February. Pres., C. W. F. Holbrook, Newark; Sec., A. S. Hawley, Newark.

Central Illinois Dental Society—Meets annually. Next meeting at Lincoln, Oct. 9 and 10, 1891; Pres., J. M Fishburn, El Paso; Sec., W. A. Johnson, Peoria.

Chicago Dental Society—Meets monthly. Pres., D. M. Cattell; Sec., L. S. Davis; Cor. Sec., T. L. Gilmer.

Chicago Dental Club—Meets on the fourth Monday of each month. Pres., A. B. Freeman; Sec., C. Stoddard Smith.

Cleveland Dental Society—Meets the first Monday of each month. Pres., S. B. Dewey; Sec., Martha J. Robinson.

Connecticut Valley Dental Society—Meets 27 and 28 of Oct. 1891, at Savin Rock, Conn. Pres., C. T. Stockwell, Springfield, Mass.; Sec., A. M. Ross. Chicopee, Mass.

Detroit Dental Society—Meets monthly. Pres., E. C. Moore; Sec., Wm. Cleland.

Eighth District Dental Society, N. Y.—Annual meeting third Tuesday of April, 1891, Union Dental Convention, Oct. 28, 1891, in Rochester. Pres., C. S. Butler, Buffalo; Sec., W. A. Barrows, Buffalo.

East Tennessee Dental Association—Meets annually. Next meeting will be held at Chattanooga, Tenn., on the first Tuesday of Aug., 1891. Pres., R. A. B. Noyers; Sec., S. N. Prothro.

Northwestern Dental Association (embraces portions of Dakota, Minnesota and Manitoba) meets annually. Next meeting at Detroit, Dak., on the fourth Tuesday in July, 1891. Pres., J. W. Cloes, Jamestown, Dak. Sec., S. J. Hill, Fargo, Dak.

Odontological Society of Pennsylvania—Meets on the first Saturday evening of each month, as 8 o'clock p. m., at 13th and Arch sts.; Pres., Jas. Trueman. Rec. Sec., A. W. Deane.

Odontological Society of New York City—Meets the third Tuesday of each month. Pres., Wm. Jarvie; Rec. Sec., E. T. Payne.

Odontological Society of Cincinnati—Meets monthly. Pres., C. M. Wright; Sec., W. M. Williams.

Odontological Society of Chicago—Meets monthly. Pres., J. Kester: Sec., E. Noyes.

Ohio Valley Dental Society—Meets quarterly. Next meeting first Monday in July, 1891, at Steubenville, O. Pres , N. H. Harrison, Cadiz; Sec'y. F. S. Maxwell, Steubenville, O.

Pennsylvania Association of Dental Surgeons—Meets second Tuesday of each month. Pres., H. E. Roberts; Cor. Sec., Theo. F. Chupein.

Pittsburg Dental Society—Meets the last Tuesday evening of each month. Pres , J. B. Williams, Homestead; Sec., N. L. Reinecke.

Fifth District Dental Society of N. Y.—Meets semi-annually. Next meeting in Syracuse. October 24-26. Pres., R. F. Jones, Utica; Sec., T. B. Mason, Phœnix.

San Francisco Dental Society—Meets the second Monday evening of each month. Pres., W. A. Knowles; Sec., Chas. Morffew; Treas., J. J. Birge.

St. Louis Dental Society—Meets first and third Tuesday in each month. Pres., John G. Harper; Cor. Sec., Emma E. Chase; Rec. Sec., DeCoursey Lindsley.

The Minneapolis Dental Society Monthly—Pres., E. F. Clark; Sec., E. J. Morrison.

Washington Dental Society—Meets second Tuesday of each month. Pres., R. Finley Hunt; Rec. Sec., H. M. Schooley.

First District Dental Society of the State of New York—Meets annually. Pres., A. I. Northrop; Sec., J. E. Dexter, New York.

Washington City Dental Society—Pres., M. B. Noble; Sec., Wm. Donally. Meets monthly.

The Western Illinois District Dental Association—Meets at Kewanee, October 16. Pres., F. Christianer, Abington; Sec., R. W. Bailey, Macomb.

PATENTS.

The following patents and trade-marks relating to dentistry were issued from February 20th to May 22nd, 1891:

20,582—(Design) Dental Cabinet, Timothy J. Collins, assignor to J. R. B. Ransom and T. F. Randolph, Toledo, Ohio.

447,291—Electric Dental Motor, Harry H. Blades, assignor to Detroit Motor Co., Detroit, Mich.

447,487—Dental Chair, Andrew Brustle, Hyde Park, assignor to J. Hood and S. H. Reynolds, Boston, Mass.

448,100—Dental Service Stand, Walter E. Warner, Brooklyn, New York.

449,401—Hand Piece for Dental or Surgical Engines, Wm. G. A. Bonwill, Philadelphia, Pa.

449,408—Dental Tool for Shaping Tooth Crowns, George Evans, New York, N. Y.

449,847—Electrical Dental Engine, Frank F. Eggers, San Francisco, Cal.

449,848—Dental Engine, John W. Gibson, San Francisco, Cal.

450,682—Hand-Piece for Dental Engines, Cassius M. Richmond, assignor to Carroll Aluminum Manufacturing Company, New York, N. Y.

450,690—Clamp Electrode for Electrical Dental Apparatus, Thomas S. Wilson, Chicago, Ill.

451,246—Dental Engine, Henry D. Justi, Philadelphia, Pa.

451,277—Dental Engine, Ceorge W. Nutz, assignor to H. D. Justi, Philadelphia, Pa.

451,371—Dental Polishing Tool, John D. Ennes, Norfolk, Va.

451,061—Artificial Head for Dentist's use, Howard C. Magnusson, Chicago, Ill.

451,701—Dental Cotton-pellet Machine, Richard N. Roberts, Rockville, Conn.

451,959—Artificial Tooth, Elbert C. Taylor, Humansville, assignor of one-half to E. N. LaVeine, Kansas City, Mo.

452,231—Dental Matrix, Christian A. Meister, Allentown, Pa.

452,533—Artificial Tooth Crown, Clarence S. Wiggins, Hornellsville, N. Y.

452,653—Artificial Denture, John J. Steadman, LaPorte, Ind.

452,665—Dental Mallet, William H. Dibble, Brooklyn, N. Y.

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THE controlling editor, Dr. S. J. Hayes, who has devoted many years to the science of Anæsthesia and Anæsthetics, in their relations to surgery, will be assisted by some of the most learned in both the Medical and Dental professions in the United States and in Europe, and the Journal will ever aim to be both progressive and aggressive; pre-eminently scientific and yet independent in all its literature and relations; belonging to no school of Physicians nor no school of Dentists, but advocating advancement and a higher standing for all in their relations to science and art. In brief, it will ever aim to be worthy of its mission and a place in every Physician's and Dentist's library.

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VIVISECTION.

An Essay Dealing with the Question, Whether Vivisection Should be Permitted in the Interest of Humanity and Science; and if so, with what Restrictions.

BY FREDERICK GAERTNER, A. M., M. D.

Vivisection, from the Latin *vivisectio* (*vivus*, alive, and *secare*, *secutus*, to cut).

Vivisection is the term employed for designating the operations performed with the knife upon living animals. This term, although including operations upon the human being, is applied principally to those performed upon the lower animals, such as the cat, dog, rabbitt, Guinea pig, etc.; even frogs and fishes.

The performing of a surgical operation upon a human being, whether under the influence of an anaesthetic, or in a comatose or hypnotic condition, is simply one kind of vivisection. Now why should vivisection of the lower animals be prohibited when the same operation is performed upon human beings every day?

What are the objects of vivisection? I answer: First, the increasing of our knowledge of physiology; second, the confirmation of facts previously known; third, the acquisition of dexterity in operative surgery, and fourth, the experimental application of inoculative medicine, including vaccination and preventive and curative inoculation.

Without this process, commonly called vivisection, the sciences of medicine, surgery, anatomy, physiology, histology, embryology and pathology would even yet be in their infancy, and in some respects, at least, would remain forever undeveloped.

Vivisection may be traced back as far as the years 377 and 460 B. C. Hippocrates, the greatest of ancient scientists, was a vivisector. Æsculapius, Celsus, Aulus, Cornelius, and later, Galenus Claudius and other great ancient scientists practiced vivisection upon the lower animals, and even upon human beings.

It is too well known to be disputed, that Galenus Claudius (Galen), who lived from 131 to 201 A. D., was the first to discover that the arteries in the human body contained blood, instead of air as had been previously supposed. How else than by the process of vivisection could he have made this wonderful discovery?

Let me cite a few of the principal benefits that have accrued to physiology, and hence to the art of healing, by means of vivisection. By this course of procedure the doctrine of the circulation of the blood, the lymphatic circulation through the lymphatic vessels, and that of chyle through the lacteals was established. Thus also our present knowledge of the nervous system and its functions is due to vivisection, since these facts could not have been obtained by the most minute anatomical research. Our present rational modes of treating epilepsy and the various forms of paralysis are due to the experiments of Brown-Sequard, Bernard and others upon the living animals.

The causes of the sounds of the heart would never have been understood without vivisectional experiments, and the stethoscope would have been useless in the diagnosis of cardiac diseases. The true nature of diabetes was thus discovered.

The Hunterian treatment of aneurism by ligature is the result of experiments upon the living animal.

The study and the application of anæsthetics, one of the greatest boons to mankind, could be pursued only by experiments upon the living animal. Who would regret the suffocation of even a greater number of animals when he considers the amount of agony and misery saved to man.

If there be a solution—and doubtless there is one—of such questions as the best method of restoring to life one apparently drowned, the restoration of one suffering from apparently fatal effects of chloroform, why chloroform kills, etc., who would regret the sacrifice of the animals necessary for these solutions?

What have been the results of vivisectional experiments during the last century? By means of vivisection the great French chemist and bacteriologist, "Pasteur," discovered his wonderful preventive inoculative treatment of hydrophobia.

Dr. Austin Flint, Jr., proved that the liver is an excretory as well as a secretory organ. By comparing the blood drawn from the carotid arteries of a dog with that contained in the jugular veins he has demonstrated that cholesterine, *i. e.*, the excretion of the liver, is the product of nerve action. Thus he was enabled to study the condition of blood poisoning, which results from an abnormal accumulation of cholesterine in the vital fluid.

By means of vivisection, we have been led to the present advanced state of knowledge in regard to the processes of digestion, assimilation and nutrition.

And now comes one of the greatest triumphs of science. By means of vivisection Prof. Koch, of Berlin, the world's greatest bacteriologist, has discovered his extraordinary curative inoculative treatment of tuberculosis (consumption), lupus, etc., etc. How else than by vivisection could a knowledge of this remarkable lymph, used in the inoculative treatment of tuberculosis, be obtained?

Thus the old world, leaning upon the staff of experience, is steadily advancing, climbing the lofty heights of science with a firm and certain tread; but we Americans, an enterprising nation, are sitting idly by, shackled by false ideas of humanity, while over our heads hangs an obscuring pall called the laws prohibiting vivisection.

Who are making the great scientific discoveries, the investigations and researches of to-day? Who are advancing every branch of medical and surgical science? Who are the great protectors of humanity? Answer, the vivisectors.

Science cannot advance without the aid of vivisection; therefore vivisection must and will be practiced in spite of laws and governments. Then why not regulate and control the practice of vivisection, instead of prohibiting it?

Congress should be urged to pass a law making the science of vivisection part of the curriculum of every reputable medical college. Our government should assist and encourage scientific vivisection in their researches and investigations, just as England, Germany, France and Austria have done during the last century, by offering capital prizes and honorary medals to scientists, microscopists and physiologists. Why not? All is in the interest of science, and principally for the protection of humanity against diseases.

But at the same time, this process, this science of vivisection should not be free to every meddler and dabbler in science. It should be practiced only by scientists, such as expert microscopists, physiologists and pathologists. If an ordinary physician or other learned man wishes to practice vivisection for study or experimental purposes, let him be compelled to do so under the supervision and instruction of a licensed vivisector, at his laboratory and under his personal observation.

Let Congress authorize the President of the United States to appoint a board of examiners for the purpose of examining applicants for the position of vivisector. Of course such applicants would be no other than expert scientists, microscopists, pathologists and histologists. Let such a licensed vivisector be connected with every reputable medical college having a pathological and histological laboratory.

I am a strong advocate of anti-cruelty societies, but at the same time I believe that man has the first claim upon humanity. If the suffering of mankind can be alleviated, is it not cruel to refuse relief?

If the practice of vivisection is properly regulated the suffering of the animal can be greatly diminished. Let the work be done scientifically, with dexterity, ingenuity and skill, and whenever it is possible, let the animal be placed under the influence of an anæsthetic—chloroform or ether.

I have had the opportunity of studying the process of vivisection and its results, during my sojourn in Europe, at Virchow's laboratory, Berlin; Rokitansky laboratory, Vienna; Pasteur's laboratory, Paris, and the Von Reckinghausen laboratory, Strassburg, and I have witnessed several thousand vivisections, and in each and every instance I came to the conclusion that vivisection is a necessary procedure and of paramount importance in the study of medicine and surgery, and their kindred and contributing branches. It is simply impossible to obtain a practical knowledge of physiology, histology, etc., without vivisection.

To prove that my assertions are correct and based upon scientific principles, I will narrate a few practical cases in medicine and surgery, in which by no other means than vivisection were the scientists able to demonstrate to the medical profession of the whole world that a certain medicine or a certain described surgical operation is necessary to save the patient and insure a speedy and complete cure.

Let us consider, first, *Surgery*.—The various surgical operations and procedures, especially as to their technique, have been developed and perfected by means of vivisection. Consider particularly the abdominal operations, such as those performed upon the stomach, intestines, liver, spleen, kidneys, etc. The honor of perfecting these operations is due principally to Prof. Billroth, of Vienna, Austria, the boldest surgeon that ever lived. He, in the year 1879, performed, for the first time, that operation known as gastrotomy, upon a living human being (a woman). This operation consisted of a resection of the pyloric end of the stomach for cancer of the stomach. A complete recovery resulted. (An excision of a portion of the stomach was made and the intestine was sewed to the stomach). Of course the original idea was developed by means of vivisection.

Previous to this adventure, Prof. Billroth and his assistant, Dr. Woelfler, had performed this operation upon ten living dogs. This was done in order to determine, positively, first, whether or not this bold surgical operation was possible and justifiable ; second, the best mode and technique of this surgical procedure ; third, the rate of mortality, and fourth, the applicability of operative surgery in the treatment of such grave afflictions.

In all the various surgical operations upon the intestines there arose questions in regard to the technique, and principally as to the best application of stitches, sutures, instruments, antiseptic dressings, etc., etc., as to the form, quality and quantity applied. All these questions and difficulties were answered and overcome by experiments upon living dogs and cats. Excisions of the spleen, of one kidney and part of the liver were tried time and again upon living animals long before the operations were performed upon human beings with good results.

The various plastic surgical operations, operations upon the muscles, nerves and bones ; operations upon the eye, ear, nose and throat were first developed and perfected by vivisectional experiments upon animals.

Some of the more delicate surgical operations, such as castration, ovariotomy, etc., were first thoroughly studied and then applied in operative surgery after repeated experiments upon living animals. These experiments and proofs have justified the surgeons in such bold surgical operations for the relief and permanent cure of such dreadful pathological disorders.

Since the term vivisection includes all experiments upon the living animal, whether the knife is used or not, there is also a medical phase of the question, and here it will suffice to say that the physiological action of all medicinal preparations would never have been thoroughly understood had it not been for experiments upon living animals. These experiments serve to determine, first, the physiological action of a drug or preparation; second, the minimum and maximum dosage; third, the poisonous effects of drugs and their antidotes, and fourth, the effects of hypodermic injections and inoculations.

To an unbiased thinker, I believe I have proven that vivisection is both necessary and justifiable. Even the humanitarian, if he be a sportsman, thinks little of the pain given to animals in the chase. No one objects to the killing of animals for food or for their commercial value, even though the animal die a lingering and painful death. If it is legitimate to slay animals in order to supply food and luxuries, and even amusement, why should it not be legitimate to inflict pain upon or to slay an animal for the higher and nobler purpose of relieving suffering humanity and prolonging human life?

Therefore, again I say, remove the prohibition, but regulate and encourage the practice of the indispensable accessory of scientific progress, *Vivisection.*

SPRING LOVE.

The spring is here in glory
  And the wild flowers deck the plain,
And the old delightful story
  Is told in Lover's Lane,
Where Corydon, just after dark,
  Is seen with charming Phyllis,
And love is in their hearts at work,
  And in their lungs bacillus. —*New York Press.*

ANÆSTHESIA AND ANÆSTHETICS.

An Address Delivered to the Cincinnati Medical Society.

BY DR. S. J. HAYES.

It is to be very much regretted that there is no other science connected with the healing art, that is so little understood, or of which there has been so little known, as the science of Anæsthesia. True, there has been no *great dearth* in writting up the subject, but what has been written, is mainly historical, and principally a rehash of what others have said or done, without a proper investigation into cause and effect. And yet, no one dare question but that to *relieve* from the agonies of pain and to render comparatively easy and safe *delicate* and *intricate* surgical operations is certainly the most *gracious boon* that can possibly be conferred by the Medical and Dental professions upon suffering humanity. That which lays at the very foundation of the study of this science, is a knowledge of the constitution of the nervous system, its *organic structure* and the laws by which it is regulated and governed. This is most certainly manifest, in that we *must* deal *primarily* and *all the time* with this most intricate and yet marvelously delicate organic structure, in which there is such a wonderful range of difference, the powers of enduranee so *varied* and so widely, and yet, strangely differing, that it is simply *incomprehensible* and *inexplicable* with our limited knowledge of this structure. Yet, we may know something of its coustituency, the laws in relation thereto and the functions of life ; and the more we know, the better we are qualified to prepare and adapt agencies to produce anæsthesia safely, pleasantly, effectually and without unpleasant after-results. I shall not now attempt to depict by diagram or chart the organic nervous system, leaving that to other and more capable hands, but I desire to call your attention to some of the laws relative to its constitution and functions, which are of *most vital* importance in relation to anæsthesia. For, mark you, anæsthesia is *not* simply a condition in which there is an *absence of sensation* as it is usually defined, but a condition in which the force and functions of life are in continuance, under modification, induced by medico-chemical agencies. And just here, I prefer to have it understood, that while I am speaking didactically, I do not speak authoritatively, and much prefer to express my own thoughts rather than the thoughts of others, more beautifully expressed, knowing full well that you will be capable of separating and gathering in the wheat and rejecting the chaff. Authority is a very good thing, and will assist in developing the arts and sciences when *right*, but when *wrong*, it is a very great evil, and materially retards the development.

While oxygen is the force of life, or that out of which *vital force* or nervo-vital fluid or animo-electricity, is generated by the pulmonary glands, yet it is not life itself. Life is an imponderable agent located in the organic nervous system which requires oxygen to make manifest the operations which characterize life, respiration, circulation and animal heat. It is believed, that life is imparted at the instant the semen is emitted. Life may continue dormant for a number of days, as will be seen by persons laying in a trance, apparently lifeless, yet again, having resumed the functions of life. Persons taken from out of the water, to all appearance lifeless, and without any manifestation of functional life, have had respiration, circulation and heat established. A frog may be frozen to represent an icicle, and yet when thawed, it will leap about sprightly. Thus it will be seen that while we may not be able to describe life for lack of its physical characteristics, we must recognize it as an *independent power* or agent capable of holding possession of its abode in the organic nervous system for a limited time, independently or without the presence of either the oxygen, or the blood. This is fully established by the fact that life will remain in the organic nervous system quite a while after all the blood, and consequently oxygen has been removed. Life being an invisible imponderable agent, or power, under whose guidance or force all the complicated organizations of man carry on their functions, and being located in the organic nervous system, only requires oxygen and blood to perform all the wonderful phenomena of life, and display its wisdom.

The heart and lungs are regulated by the cardiac and pulmonary ganglions and the pulmonary glands, secrete animal electricity or *nervo-vital* fluid. This is demonstrated beautifully in the evolution of electricity by the torpedo. That the pulmonary organic glands are capable of generating or giving off animal electricity or vital fluid by the entrance of air into the lungs, and its passage through the glands and union with venous blood, is clearly manifest in this peculiar species of the finny tribe. The partitions of the electrical column are covered with a fine net-work of arteries, veins and nerves. They are very vascular, sending inward from the circumference, all around on each partition, small arteries which anastomoze upon it, and passing also, from one to another, unite with the vessels of the adjacent partition. Goldstream says: The nerves of the electrical organs of the Gymnotus are derived from the spinal marrow alone. They are very large and numerous, and are divided into very fine twigs on the cells of the organs. There is a wonderful similarity in a section of the electric organ of the Torpedo and Gymnotus and a section of the lung. The sections of both organs are furnished with arteries, veins, nerves and cells. Both these organs are amply supplied with animal nerves derived from the spinal chord, and therefore the medulla is continuously supplied with this nervo-vital fluid, and is the seat or reservoir of *vital force.* This vital force, or nervo-vital fluid, is sent out from the medulla through the nerves at the behest of life itself.

Thus it will be seen, that by the union of oxygen with the pulmonary glands and venous blood, the functions of life are made manifest as characterized by respiration, circulation and animal heat. Therefore, it follows, that whatever has a tendency to weaken or strengthen the action of the heart, will accordingly effect the temperature of the body; and also, whatever depresses or excites the nervous system, weaken or strengthen respiration, and the functions of the heart, that being the result of the evolution of electricity or nervo-vital fluid by the pulmonary glands, and the union of oxygen with the blood, which latter can only be effected by the evolution of animal electricity as evolved by these glands and the cerebral glands of the brain. Consequently, as you suspend or cut off the supply of free oxygen to the lungs, the pulmonary glands cease to generate and furnish *vital force*, both to the nervous system and to the blood. The *safety* and *continuance* of life depends upon a sufficient supply of *free oxygen* to furnish sufficient vital force to sustain the functions of life. If it be true, that anæsthesia is *only* a condition in which there is an absence of sensation as it is usually defined, then either asphyxia, syncope, paralysis or death would be anæsthesia, as in these conditions there is an absence of sensation. Yet, no sane, well-informed man will ever want either of these physical conditions for a safe surgical operation. Words are employed to represent ideas, and they should represent them so clearly that there be no confounding nor leading astray by their use. I should say that anæsthesia is a physical condition differing *radically* from every other, in this, that in this condition the forces and functions of life, must be in continuance under modification—modification induced by medico-chemical agencies—suitable narcotics, whereby an absence of sensation is attained. The force of life, being oxygen in a *free* state without which *you* cannot produce anæsthesia, it is the all important element in your anæsthetic. Free oxygen is oxygen, *not chemically combined* with any other chemical element, but simply in a state of mixture as found in the atmosphere. The moment you combine it chemically as in Nitrous Oxide Gas ($N^2 O$) it loses its properties and functions. This is in accordance with the fundamental law of chemistry which is more binding than the laws of the Medes and Persians, because it is founded in nature itself and is as eternal. Consequently, agencies that do not contain free oxygen, such as the numerous preparations from methelic or ethelic alcohol, as Ether, Chloroform, etc., are not anæsthetics for the reason that they do not contain oxygen in a free state, but are simply suitable narcotics producing exciting sedative, soporific or iodide effects, depending upon the state of administration. Therefore, it will be readily seen, that you make your anæsthetic when you use any of these narcotics and that the narcotic preparation is simply a modifier and the subordinate element in your anæsthetic. You may modify by a super quantity of oxygen in a free state, which you have by rapid inhalation and which produces a toxicological effect upon the nerve centres and by which you may produce anæsthesia in some persons, sufficient to perform a minor surgical operation without incurring pain. However, your suitable narcotic is not only a convenience, but very necessary as a subordinate element in your anæsthetic. Yet, you must have sufficient free oxygen to furnish the red corpuscles in the blood and to sustain life without which you cannot have anæsthesia but will have asphyxia and you may have death. Asphyxia can *only* be produced by suspension, abrogation or cutting off of the force of life (oxygen in a free state) and then when you do not have sufficient force (free oxygen) to eliminate the narcotic from the blood and system, your patient sinks and gradually looses the functions of life and then all the powers of earth cannot resuscitate. Unpardonable and outrageous errors have been committed by many writers on the subject of "Anæsthetics and Artificial Anæsthesia" in confounding mere asphyxiating agents with true anæsthetics, and in not recognizing and representing the marked difference both in their properties and functions as well as in their effects.

Asphyxia is the natural and legitimate result of depriving the blood of oxygen in its simple and chemically unconnected form. Anæsthesia is a state of insensibility induced ordinarily by narcotizing the patient with a suitable narcotic while sustaining the force and functions of life, with this life-giving principle. Therefore, while insensibility is an attribute of asphyxia as well as of anæsthesia, yet they are radically different and diametrically opposite in their tendencies and results. The former may be properly designated as "the first step in at deaths door," while the latter is the happy state of *insensibility* with the possession of the forces and functions of life. The failure of Nitrous Oxide (N^2 O) Carbonic Oxide (C O) or Carbonic Acid (C O_2) or any other similar inert gas to sustain respiration and life, is not attributable to a lack of oxygen in them as they contain a greater quantity of oxygen than the atmosphere, but that the oxygen and nitrogen or carbon in the gases are in *chemical union* and that the affinity of the oxygen for the other gas, is greater or stronger than the affinity of the blood for the oxygen and consequently the blood cannot appropriate the oxygen and therefore, these gases fail to support life. In the atmosphere (N_4 O) these gases are in a state of admixture, not in chemical union and therefore the oxygen readily enters the blood to sustain life. And since pure undiluted oxygen is too irritating and exciting to sustain life without detriment and since as it is found diluted with nitrogen in the atmosphere, it is readily appropriated and meets the wants of life perfectly, and since when found in any other condition or combination and appropriated, it always endangers health and life, the use of Nitrous Oxide, Carbonic Acid or any other asphyxiating agent for the pretended purposes of producing anæsthesia, should be prohibited by appropriate legislation. In fact, these agencies antagonize life from the first inspiration. And a cat or a dog, or a man will cross over the death line when the exclusive use of Nitrous Oxide Gas or any other asphyxiating agent, has so weakened the affinity of the blood for oxygen that it cannot appropriate the oxygen when the air is admitted to the lungs. And although, thousands have taken this so called "Laughing Gas" without apparant injury, yet, it antagonizes life from the very first inspiration and no man, however strong, can be deprived of sensation by the loss of *vital force* without some injury in some way to his nervous system. The loss of *vital force* and *neural energy* in many have resulted in consumption and insanity, or both. Hence, the use of asphyxiating agencies, as Dr. Richardson says, "should be prohibited by law." But when an anæsthetic is inhaled, the narcotic element passes into the lungs with the oxygen, the narcotic is thus communicated on the union of the oxygen with the organic glands and simultaneously into the glands and the organic ganglions and into the venous blood. The narcotic agent is thus conveyed into the nerve tubules which enter into the organization of the ganglions by their connection with the organic glands and the vascular membranes which surround the ganglions. Thus, the formation of the ganglions, are interfered with and the superior central ganglion and the cerebral glands are placed in a *quiescent state* and cease giving off this *nervo-vital fluid* to stimulate the nerve fibers of the brain and the mind ceases to act, or acts *feebly* and sleep is the result. The narcotic element is also communicated to the external, middle and internal coats of the arteries by the arterial blood. It is still further conveyed to the muscular fibers by their connection with the capilary arteries, causing their relaxation and ultimately interfering with the action of the pulmonary glands which will only occur when you have an over-percentage of the narcotic element in your anæsthetic.

Before a person is fully anæsthetized, he gets apparently drunk. This is caused by the confused action of the brain, consequent upon the irregular and interupted secretion of the nervo-vital fluid by the cerebral glands.

Having described the channel through which the chemical and mechanical effects of anæsthetics, are produced upon the nerve centres which may be denominated the secondary or remote effects; I will now speak of the immediate or primary effects upon the nerve centres, the nervous system and their relations to the functions of life. The axiom—"never a result without a cause" must be borne in mind. When the statistical reports of deaths from the use of chloroform, ether, etc., show that the most of the deaths have occurred in the first stage and in the hot season of the year, we inquire for the cause. In so doing, we ascertain that the anæsthetics are introduced into the system very much as electricity is introduced, namely, through the *sensory nerves*. The pneumo-gastric nerve extending into the lungs, and stomach, is principally a sensory nerve. The sensory nerves communicate from without to within the system, or from the periphery to the nerve centres, and the *vassomotor nerves* from within to without, or from the nerve centres to the periphery. There is a circulation independent (and yet not independent) of arterial and venous circulation. The circulation of a substance within the nerves, which for want of a better name, we call *nervo-vital* fluid. This is the medium of communicating intelligence to the nerve centres and power to the physical organs, whereby they are enabled to perform their functions, and without which there can be no *neural force* nor *physical power*. Consequently, not a function of life can be performed when this circulation stops. As the functions of the lungs and the heart, as well as every other organ, are performed at the demand of the medulla and the behest of life, when the circulation of this vital fluid in the medulla is suddenly arrested by the abrupt introduction of an over quantity of electricity, or an over percentage of a powerful narcotic, such as chloroform, or by a sudden action of the mind in an extremely delicately, nervously constituted person, you have *concussion*, *revulsion* in neural circulation and paralyzation. There are two agencies operating upon and through neural circulation and neural force—the one internal, the other external. The former, we denominate intellect, the latter, *chemical* and mechanical and these two agencies produce similar effects.

By a sudden, startling action of the mind as by the sight of blood, or fright or sudden death, revulsion in neural circulation in the sympathetic pneumo-gastric nerve in the stomach, is produced and nausea is the result ; a little later on you have its *reflex* in the medulla a partial paralysis, and you have syncope. Or the action of the mind may be so quick and *powerful* that a terrible concussion, revulsion and paralyzation is the result, sometimes producing death. The latter condition is frequently produced by the sight of a revolting death, or by the sudden breaking of *very saa news* to an extremely delicately nervously constituted person, such as the sudden and terrible death of a very near and dear friend. This is a sudden *arrestation* of the circulation of the nervo-vital fluid in the medulla, and when this occurs every function of life suddenly ceases. The very same effects are produced by the external agencies. The sudden introduction of too great a volume of electricity or an over percentage of the narcotic element in an anæsthetic or *severe pain* (which is mechanical) will produce nausea, syncope, paralysis or death. If you have the functions of life cease at one, two, three or four inhalations of chloroform, or any other narcotic, you have simply paralysis from a sudden induction of an over percentage of the narcotic in your Anæsthetic. If you generate and introduce electricity in close observance, and in accordance with the laws of nature, your patient will receive it kindly, and you will not have fatal results. You commence the induction of electricity—after placing the poles of the battery in the hands of your patient—by turning on a very light volume, and then increase the volume as your patient is capable of receiving it. By so doing, you stimulate neural circulation *gradually*, and thereby increase the capacity to receive without producing concussion or paralyzation. In this way your patient is prepared to receive and retain a much greater volume of electricity than would have produced death had it been suddenly inducted. Fill a Leyden jar with this subtle agent and let it into a man all at once, and the functions of life will instantly cease. But you can fill fifty jars with electricity and turn it into him gradually on an insulated stool without injury. If he has a hat on his head it will likely tumble off, and his hair will stand up like the quills of a porcupine; but if he does not know what you are doing, he wonders that the hat and the hair behave so strangely, yet if it pass out of him gradually he is none the worse for it. Just so in generating and applying anæsthetics. If you generate and induct an over percentage of your narcotic element *suddenly*, especially if it be a powerfnl drug such as chloroform, you will likely produce a *shock* or concussion in the medulla of an extremely delicately, nervously constituted patient, in the first, second or third inhalation. This result is not produced by your narcotic through arterial and venous circulation, as is generally taught, but by the chemical action of the narcotic upon the nerve centre and through the sensory nerves. It is estimated that an ordinary sized man has about 1,400 square feet of surface in his lungs, over which the pneumogastric nerve, with its tens of thousands of nerve filaments are spread out, ready to apprehend and receive your anæsthetic as it is introduced. If your narcotic happens to be chloroform (for instance), of which it has been estimated by the Royal Medical and Chirurgical Society of England, that 3½ per cent. is sufficient for the average patient, 6 per cent. is dangerous and 12 per cent. is almost sure to produce asphyxia, plus-narcotism and may be death, and if your patient happens to be the delicate one previously described, and if you, instead of commencing the introduction of your anæsthetic with about one or two per cent. of the narcotic, *abruptly* commence with about 30 per cent., don't be surprised at your fatal result. You have violated nature's laws and must abide the consequences. You should be prosecuted for *mal-practice*, and suffer the penalty of your crime.

But if you commence the induction of your narcotic with about one per cent. and then increase the percentage just as your patient kindly receives and tolerates it, you will *never* produce concussion or paralyzation. But deaths sometimes occur in the latter stages of anæsthesia, and yet not without a cause. If you have a death from the secondary effect of your anæsthetic, it *is* produced by over-crowding the blood with the narcotic element, so as to crowd out the necessary quantity of free oxygen to furnish *vital force* sufficient to eliminate the narcotic and to sustain life. Therefore, when you have a death in what is known as the third stage of anæsthesia, you always have asphyxia first; and when you have it so profound, or have reduced the quantity of free oxygen in the blood, so that there is not sufficient *vital force* to eliminate the narcotic, your patient sinks and is soon irrevocably dead.

Hayes Process of Generating and Applying Anæsthetics, with the appropriate Apparatus removes the cause of these fatal results by regulating the pro rata or percentage of the narcotic in the anæsthetic, so as to not only know *positively* about how much of the narcotic is in the anæsthetic at every stage of anæsthesia, but to regulate the same so as to *adapt* it to the kindly tolerance of the patient in all the various stages of anæsthesia, and thus prevent a "*shock*" or concussion and paralyzation in the first stage of administration, and asphyxia and death in the latter stage. Nausea and vomiting are frequently unpleasant results in the administration of chloroform, ether, etc., by the ordinary methods of administering. This is caused first by the deposition of the globules of vapor into the buccal fluids. These also irritate the fauces, epiglottis, mucus membranes of the bronchial tubes and air cells of the lungs. Hence, if you *destroy* these globules of vapor, you will obviate these unpleasant results, which is done by the Hayes Process and Apparatus by friction in the production of counter currents of air within the Generator. Another frequent cause of nausea, is the sudden introduction of an *over-percentage* or undue quantity of the narcotic element, which produces *revulsion* in neural circulation in the sympathetic *pneumo-gastric* nerve in the stomach, very similar to that which is caused by violently striking this delicate organ. Therefore, if you will generate and apply your anæsthetic by destroying the globules of the vapor, and regulate the percentage of the narcotic element in the anæsthetic, so as to adapt it to the kindly tolerance of the patient in all the stages of anæsthesia, which is accomplished by the Hayes Process and Apparatus, you will neither have *nausea* nor *death* resuiting from your anæsthetic when using a suitable narcotic as the subordinate element. Many physicians and dentists think an abnormal condition of the heart, or what is commonly known as organic heart disease, or inflamed bronchi or lungs, forbid the use of anæsthetics. This impression has been extended and confirmed by the notorious fact that the heart, the lungs and the brain have been made the *scape goat* for many a man's just punishment for his criminal mal-practice in the use of the so-called anæsthetics. When a death occurs a friend is sought to conduct an autopsy; he selects a few of his medical friends, whom he can readily influence, and they proceed to investigate the heart, the lungs and the brain, and when through with the *post mortem* examination, they announce that they found clots of blood in the heart, and that there was evident valvular disease of that organ; or that they found a congested condition of the brain, the arteries contracted and evidences of embolism, and that the death occurred from the diseased condition of these organs. Now, I submit to your intelligence, whether even alcohol, much more sulphuric ether, chloroform, etc., will not produce a congested condition of the brain, contract the arteries, and produce evidence of embolism, and whether you are not likely to find even in the heart of a slaughtered beef, clotted blood, much more so would you find clots of blood in the heart of any animal from whom the blood has not been previously taken. Such autopsies may suffice to shield the character and reputation of the perpetrator, or the man himself from his just punishment for mal-practice, but I protest against its being received as a scientific investigation of cause and effect. If the heart is diseased what is the cause of the specific disease? If the left or right mitral valve drops strokes, we find that there is a remittant flow of *nervo-vital* fluid in the moter nerves of these valves. If there is dilitation or fatty degeneracy of the heart, it can invariably be traced to an imperfect circulation of the nervo-vital fluid in the nerves of the muscles of the heart. But if you induct your anæsthetic in the manner here described, you will not interrupt neural circulation, and the functions of life, will be in continuance, and you have anæsthesia safely produced.

PEROXIDE OF HYDROGEN AS A THERAPEUTICAL AND BLEACHING AGENT.

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Perhaps no remedy of recent notice, has attracted so much attention, or realized so fully the expectations, as oxygen in some forms.

The most notable feature in regard to oxygen is the entire freedom with which it may be used on the tissues of the body without injurious effects, and that, while it is held in the greatest esteem by many, it is *condemned by none*. This cannot be claimed for any other remedy. Oxygen has no enemies, and if it had, being nature's own remedy, it would eventually triumph, notwithstanding man's tendency to ignore it in the treatment of disease.

For all practical purposes we are surrounded by an atmosphere of oxygen to which we are, doubtless, more indebted for the recovery from disease and the healing of wound than to the medical man with his pills and potions and multitudinous antiseptics. But experience has demonstrated that oxygen, at the moment of liberation from any of its compounds, having an unsatisfied affinity, is more active than in its free state as found in the atmosphere.

Peroxide of hydrogen is a very unstable chemical compound, from which oxygen is readily liberated by contact with substances having an affinity for it. The most probable impurities to be found in it are sulphuric and hydrochloric acids. The presence of the former in an objectionable amount may be determined by the cautious addition of baryta water, which gives a white insoluable precipitate of the sulphate of barium, if sulphuric acid is present. In like manner, by adding a solution of nitrate of silver, a white, insoluble precipitate of chloride of silver is formed if hydrochloric acid is there.

Peroxide of hydrogen, when properly applied, may be considered one of the most active, as well as harmless agents which we possess for sterilizing putrifying substances, after which it is without any further action on the tissues—in this manner differing from creosote, carbolic acid, bichloride of mercury and any other antiseptics which depend on their poisonous property and caustic, irritating effects for their antiseptic virtues, and are attended with danger in their concentrated form.

An ideal therapeutic agent in the treatment of septic conditions is one that may be used freely on the tissues, and not only arresting the fermentative process preceding organic decomposition, but, also, sterilizing and disinfecting the products already formed. There is no remedy in present use which fills this want so well as peroxide of hydrogen. While, according to Bert & Reynard, the soluable ferments, such as the saliva, gastric juices and pancreatic fluids, continue to act in solutions of peroxide of hydrogen, purulent secretions are instantly dispelled in the form of gas on being brought in contact with it. Such has been my experience after experimenting with all forms of pus and septic matter I have been able to procure. Purulent secretions, as found in boils or festered wounds, when brought in contact with peroxide of hydrogen, produce a rapid reaction by disengagement of gas, and are thrown up in a white, frosted form, almost identical in appearence to the white of an egg which has been thoroughly whipt. Likewise, the more slowly, the hard, clotted mucus taken from the nostril may be acted on, being first softened and discolored, and finally thrown off as a white froth. Decayed matter found in the crown cavities and pulp canals of the teeth, under its action give off rapidly bubbles of gas, leaving that portion which is not ejected in the form of gas in a softened condition, which, in most cases, detaches readily under the use of the excavator, and coming away with ease. This is a decided advantage, as decayed matters which sometimes adhere so tenaciously to the sides of the walls of a cavity may be softened to such an extent as to peel off easily under the use of the instrument.

We will often find, also, that cavities which appear on examination by the eye or mirror to be perfectly prepared, give off bubbles of gas on being treated with peroxide of hydrogen, thus showing the cavities, which have been prepared to the best of our judgment, may yet contain septic material. This is specially apt to occur in white decay, where it is impossible for the eye to distinguish between the sound and decayed structures, and where, in spite of all efforts, there is often a failure to thoroughly disinfect the parts. Here this agent cannot be too highly prized. Indeed, it would be well if we kept a constant supply in our cabinet, and used it in every time before filling—letting it remain in the cavity for a minute or so before filling, or so long as bubbles continue to rise to the surface. In this manner cavities, which apparently are perfectly prepared and ready to receive filling will, many times, be found to contain infectious matter.

In treating a diseased surface in the mouth, it is customary, before applying the therapeutical agents, to cleanse the parts of clotted mucus and adhering secretions by the use of warm water, so that the remedies used may come in contact with the tissues, for, cold water not dissolving or removing the clotted secretions of the mouth or from wounds, the remedies used do not come in free contact with the tissues unless they are of such a corrosive nature as to eat their way through. Here peroxide of hydrogen has no equal, though, on the score of economy, warm water may be found useful to remove mechanically the coarser portions of collected matters, it should be left to peroxide of hydrogen to go over the parts and remove chemically all purulent collections of minutest kind, which it does perfectly.

Prof. Gorgas, in his Dental Medicine, describes its application as entirely painless. This will be found true, except where it is injected into the nasal passages, where it produces a sharp, stinging sensation, requiring its dilution till the pain is reduced. But, as cool water produces pain when used here, it may be attributed more to the peculiarity of the sensitive-nerves of this locality than to the properties of the drug.

By its use as a spray from the atomizer, chronic or acute catarrh may be cured. For which purpose it should be diluted till the stinging sensation becomes bearable, after which it is best to use it of as great strength as possible.

It may be relied on as the most valuable antiseptic and disinfectant in use in the treatment of abscesses, access being made first to the cavity of the abscess, and the hydrogen peroxide injected, and repeated till no reaction occurs; any remedy being liable to disrepute if placed in a crown cavity and expected to cure an abscess at the extremity or the root.

The good results obtained by the use of the eucalyptus and iodoform in the treatment of abscesses and wounded surfaces is thought by some to be caused more to its therapeutical influences over the tissues than to its antiseptic virtues. And, according to Dr. Black, in April *Cosmos*, a series of experiments have shown that the bacteria found in the cavaties of decayed teeth continue to develop in solutions of eucalyptus or idoform. But, as the drugs are often combined with others, and their use preceded by the free use of water, it is hard to determine which exerts the most beneficial influence. The advocates of hydrotherapy will give the credit to water, those favorable to eucalyptus to that drug, while the general surgeon is willing to stake his reputation on the iodoform.

Peroxide of hydrogen is, probably, the only agent which has detergent, anteseptic, disinfectant and non-poisonous properties combined with a healthy therapeutical influence over the tissues. As a detergent I have used it in conditions of the mouth where the gums and mucus membrane were covered with clammy, sticky coating of mucus, which adhered very tenaciously, cleaning them off thoroughly and leaving the parts beneath clean and pure. As an antiseptic and disinfectant, to get an idea of its value it may be compared with sulphur dioxide, $S\ O_2$. If a tooth, having a large cavity still containing the *debris* from the decomposed structures, be taken and filled with peroxide of hydrogen, bubbles of gas will immediately commence to ascend rapidly to the surface, showing that a septic condition is present. If this is rinsed as soon as the action commences and before it has time to complete it, after treating with sulphur dioxide, $S\ O_2$, for a short time, no bubbles of gas are given off on the reapplication of hydrogen peroxide. This shows conclusively that it has antiseptic and disinfectant properties; for, as soon as the *debris* is disinfected, peroxide of hydrogen is without action on it, while before such treatment it was extemely active. In regard to its non-poisonous properties, I have, myself, swallowed it freely without the least injurious results that I could determine.

In regard to its therapeutical influences over the tissues, we may quote the conclusions of Bert & Reynard. They say: "that peroxide of hydrogen, even when very dilute, arrests fermentations due to the development of living organisms, and the putrefaction of all substances which do not decompose it; that containing, according to circumstances, from two to six times its volume of oxygen, it is capable of advantageously replacing alcohol and carbolic acid; that it can be employed externally for dressing wounds and ulcerations of all natures, in injections, and in vaporizations, and internally; that the results obtained in the largest operations, up to the present, are in the highest degree satisfactory; that not only fresh wounds, but old ones, proceed rapidly to cicitrization, and reunion by first intention appears to be encouraged by its use as a dressing; that the general, as well as the local, state appears to be favorably influenced; that the advantages over carbolized water are its not having any poisonous effect nor unpleasant odor, while its application is entirely painless. It is an effective application in a large class of diseases in which mucous tissue is chiefly affected, and for cleansing purposes, is considered to be unequalled. "It is employed as an internal remedy in low forms of fever, chronic and sub-acute rheumatism, whooping cough, chronic bronchitis, dyspepsia, as it improves digestion, diabetes, etc." "It acts very promptly in feeble, flabby or ill-conditioned ulcers, chancre, and diphtheritic sores, ozoena, wounds, both flesh and putrid, etc.."

Peroxide of hydrogen is also useful as a bleaching agent for discolored teeth, and has the advantage of being entirely harmless and without chemical action on the structures of the tooth; is not irritating to the tissues of the mouth; does not itself produce another form of discoloration; requires no special instrument for the introduction of fillings after its use, nor the removal of adjacent fillings to prevent chemical action on their metals with resulting stains.

When practicable, it should be used to the exclusion of all other agents in those cases requiring an oxidizer to remove discoloration, it being objectionable to use other oxidizing agents which weaken tooth structure, or within themselves are liable to produce another form of discoloration, which is, at times, almost impossible to be gotten rid of. It is not claimed for peroxide of hydrogen that it will bleach all forms of discoloration; no one agent will do this; but it should be used in all cases except where, from the nature of the discoloration, a special bleaching is required to chemically combat the peculiar stain deposited in the tubuli, as the cyanide of pottasium to remove silver stains, oxalic acid to remove discolorations from manganese dioxide, and similiar cases, in which only a chemical compound is effective. The bleaching action of hydrogen peroxide appears to be exerted on the decomposed animal matter or mucous stains. It acts on the block sulphid of lead ($Pb S$) and converts it into the white sulphate of that metal ($Pb SO_4$). In bleaching, after taking away with the excavator as much of the decomposed and discolored material as is desirable, the cavity of the tooth should be filled with a solution as concentrated as possible, and refilled till no bubbles of gas are given off on applying it. Or it may be applied on cotton which is saturated with it, and reapplied as often as necessary. The weaker the solution used the more stable it will be found, but requiring a greater length of time in bleaching in proportion to its dilution.

The presence of acids retard, and alkalies hasten, its action, consequently our time may be economized by the addition of such a quantity of a solution of lime water or bicarbonate of soda as will render it alkaline in reaction.

Observations as to the length of time in bleaching are liable to differ, if we do not take into consideration the percentage of the solution used. For by calculation, we readily see that a concentrated solution of 100 per cent. would bleach in one hour to an extent requiring twenty-five by a 4 per cent. solution. But it does not follow that because we buy a solution containing a large percentage of oxygen that it will retain such a strength, as left in bottles unstopt, or at a temperature higher than 70 F., it losses its oxygen.

The following table will show the amount of oxygen found in solutions of peroxide of hydrogen of varying percentage:

100 grains of a	100	per cent. solution of	hydrogen peroxide	contains	47.6	grains O,
100	"	50	"	"	"	23.8	"
100	"	25	"	"	"	11.9	"
100	"	12	"	"	"	5.712	"
100	"	4	"	"	"	1.904	"
100	"	2	"	"	"	.952	"

The above shows that if a 2 or 4 per cent. solution is used, the action must necessarily be extremely slow as compared with a concentrated solution.

The danger of using permanganate of potassium as a bleaching agent is referred to by Dr. E. C. Kirk, of Philadelphia, in the June number of the *Items of Interest*, as follows:

" In the case of potassium permanganate, there results, among other manganese dioxide, MN O_2, a dark brown solid, which in itsself produces a discoloration that must be gotten rid of afterward by strong solution in oxalic acid, with which it forms an almost colorless and soluable compound. I have used this substance for bleaching teeth, but care must be taken not to use it in a very concentrated solution, otherwise the final treatment with oxalic acid may fail to remove the discoloration from the manganese dioxide which has been precipitated in the tubuli, and leave the tooth in a worse condition than the first. Used with care, in dilute solutions of a claret color, and almost immediately followed by a strong oxalic acid or binoxalate of potassium solution, I have obtained good results where the tooth structure to be bleached was not very thick or dense."

The use of chlorin in any form, while the most universal, is, without doubt, the most injurious agent on tooth structure which could possibly be selected from our present list of bleaching agents.

The following precautions, according to Professor Truman, of Philadelphia, should be observed:

"The treatment of the tooth previous to bleaching is the same for all methods. The upper third of the pulp canal should be solidly filled with gutta-percha. Gold has been recommended, but should not be used in any tooth bleached by chlorine, as it is attacked by the latter, and the auric chloride formed decomposes in the presence of organic matter by the action of light and oxygen, and results in a permanent purple stain which cannot be gotten rid of. For this reason a tooth to be bleached should have gold fillings removed if they are in position.

The cavity should in all cases be washed out with ammonia or borax to remove fatty matter, and no substance which has the power to coagulate the albumen should be used, as such prevents the ingress of chlorine to the tubuli. For the final washing, distilled water should be used, as river water, ordinarily, contains sufficient iron to stain the tooth in combination with the chlorin as ferric chlorid.

"Lastly, after the bleaching is completed, the cavity and pulp canal should be filled with oxychlorid of zinc, which should be inserted with instruments of bone, hard rubber or wood. It should be carefully borne in mind that no metalic instrument should come in contact with the tooth after the chlorin has been applied."

The foregoing precautions so limit the actions of the practitioner of dentistry as to render the use of chlorin in bleaching teeth as an act which should be resorted to only in desperate cases, for we note that gold fillings in position should be removed to avoid discoloration from auric chlorid; that only oxychlorid of zinc or gutta-percha may be used as filling materials, and that only instruments of bone, rubber or wood are admissible in applying the filling material, as metalic instruments should not be brought in contact with the bleached surface, for fear of producing a different form of discoloration.

But such are not all the objections to the use of chlorin for this purpose, that of injuring the tooth structure and irritation to the throat of the patient being important considerations. The hydrochloric acid formed during the bleaching process by chlorin is, probably, the most active destroyer of tooth structure that can be selected, a solution of this acid completely destroying a tooth in from 10 to 20 hours, though a concentrated solution of sulphuric acid requires about the same number of days to accomplish the same end. Therefore, the conclusion we arrive at is, that chlorin is the most injurious agent which can be used for bleaching purposes; sulphur dioxide, SO^2 which is a valuable disinfectant, less injurious, and peroxide of hydrogen least injurious, or, rather, not injurious, but decidedly beneficial, whether it is in the cavity of a tooth or the throat of a patient.

The demand for peroxide of hydrogen being small, it is difficult to produce it in just any percentage of strength desired and at the low price at which it might be obtained if it had a larger sale, as the materials from which it is manufactured are cheap.

To obtain the best results from peroxide of hydrogen, the following points should be borne in mind:

1. That it should be kept in glass stoppered bottles at a temperature not higher than 70° F., though when diluted it may be kept at a higher temperature without being decomposed.

2. The presence of acids retard, and alkalies hasten, its action.

3. That its action is quickened in proportion to its concentration, and that if used in very small strength for bleaching, it may require a length of time greater than the dentist or patient is willing to give.

4. The most common impurities being sulphuric and hydrochloric acids, the sulphuric acid may be detected by the addition of a small quantity of baryta water, and the hydrochloric acid by a solution of nitrate of silver, when, in either case, a white precipitate will be formed if the acid indicated be present.

5. When used to clear the nasal passages, the stinging sensation may be reduced by dilution, and heated to the temperature of the body.

6. That when used in abscesses or other diseased conditions, it should be carried to the parts affected, as, unlike carbolic acid or creosote, it possesses no curative powers when applied to remote parts as a counter-irritant.

7. Re-apply as long as bubbles of gas are given off.

By carefully following out each of the preceding rules, peroxide of hydrogen is an indispensable article in the dental office.—*Southern Dental Journal.*

THE NEW HYPNOTICS.

At the last annual meeting of the British Medical Association, in the discussion of the action of the newer hypnotics, Dr. John Gordon read a paper based on the results attained from his physiological and clinical studies as to the use of urethan as a hypnotic (*British Medical Journal*, November 2, 1889).

Urethan is the ethylic ether of carbaminic acid, and its formula $C_3 H_7 N O_2$. It occurs in transparent crystals, which have a cool, saline, and somewhat bitter taste. It is readily soluble in hot or cold water, is also soluble in its own bulk of rectified spirit, but slightly less soluble in ether. Its ready solubility in water, as well as its non-irritant nature, allow of its being employed hypodermically as well as by the mouth.

A series of experiments were performed on frogs to observe the action of the drug on the reflex functions of the spinal cord. The method employed was to decerebrate a frog, to wait till the shock of this operation had so far passed off, to ligate the iliac artery and vein of one limb, to suspend the frog by the head, allowing the hind limbs to depend, to immerse the hind limbs alternately or together in a solution of sulphuric acid (1 in 600), to record by a metronome the time of movement or withdrawal from the acid solution, and to well wash in water the limbs after each withdrawal. When the moment of withdrawal or moment was almost the same in both limbs, to inject below skin of thorax the dose of urethan dissolved in salt solution (.75 in 100), and to proceed with the immersion as before. The result of a large number of the experiments showed that a longer period of time elapsed between the application of the stimulus and the reflex action. The urethan thus diminishes the excitability of the spinal cord.

That urethan had an action on the peripheral endings of the sensory nerves was shown by the elongation of the period at which the unligated limb was moved or withdrawn from the stimulus; and also, in some cases, by its rapid abolition of all movements in the unligated limb. It was further observed that sometimes frogs, in which reflex action had been quite abolished by 5 decigramme of urethan, recovered their reflex in twenty-four hours, and even in forty-eight hours, when kept carefully moistened with a three-fourths per cent. salt solution. The great majority of frogs died shortly after the administration of this dose of urethan.

Dr. Gordon was likewise able to confirm in his experiments the statement of M. Coze, that since urethan diminishes the excitability of the spinal cord, it is antagonistic to strychnine, and may, therefore, be used with value in conditions attended with convulsions, and more especially in cases of tetanus. His experiments on blood-pressure and respiration indicated that the most marked feature of the influence of this drug is in slowing the respiration, a reduction being produced after each injection of urethan. There was also a general tendency to slowing of the pulse and a gradual reduction of blood-pressure, but after division of the vagi, the pulse rose within two minutes to its original rate, and the blood-pressure to within two millimetres of its original rate. This seems to point to an action being exerted by the drug upon the central nervous system ; in all probability on the vagus roots. The acceleration of the pulse and elevation of the blood-pressure are more than could have been anticipated under the circumstances, as a result of vagus tonus, provided that no stimulation of the central vagus apparatus had been present. His experiments to determine the amount of urethan, producing irritation showed that the nerve-trunk was not markedly affected by the smaller doses (two per cent. solutions), but when treated with stronger doses (four per cent. solutions), the nerve-trunk speedily lost its conductivity, which it did not recover by a subsequent washing in salt solutions (three-fourths per cent.). On the muscles Dr. Gordon found that the result of a series of experiments on this part of the subject showed that two per cent. solutions of urethan in salt solution abolished the normal tetanic curve, which, on further stimulation at definite periods, became still weaker, and finally failed to respond to faradic stimulation. If the muscles at this point, were well washed in salt solution, and immersed in it for five to ten minutes, and stimulation again applied, the irritability of the muscle was found to have been so far recovered ; subsequent washings and immersions still further tending to restore the irritability ; and that this irritability of the muscle substance was speedily abolished, as shown by the slowing and abolition of the normal tetanic curve ; and that the muscle, although immediately washed at this point in salt solution, showed only slight tendency to recover its irritability.

The action of urethan on muscle substance is much like that of paraldehyde. Both drugs in weak solutions temporarily abolish the irritability of muscle substance ; both allow of considerable recovery of the irritability when the poisoned muscle is speedily washed with salt solution ; and with strong solutions, urethan, like paraldehyde, tends to destroy the irritability of muscle, so that washing in salt solutions only feebly recovers it. Also with strong solutions both drugs tend to cause the muscle to pass into rigor. Urethan, however, does not show any initial rise of irritability in the muscle when applied in weak solutions, as paraldehyde often does.

Dr. Gordon's clinical experiments were made upon boys recovering from minor surgical ailments. They were placed on a selected mixed diet of their own choice, the fluids of which were carefully measured and the solids accurately weighed. This regulated diet was steadily continued during the time of the observations. The dose, which was given dissolved in cold water, was given in the morning at nine o'clock. It was thought that by choosing this hour its action as a hypnotic could be better observed, as the subject, presumably having had a good night's rest, would be less inclined to sleep. After the administration the patient was kept quiet in bed. The following summary affords the results of his observations, both clinical and experimental :

1. It reduced the excitability of the reflex action of the spinal cord.

2. It diminished peripheral sensation.

3. Pharmacological and clinical observations showed that it slowed the respirations.

4. It also slowed the pulse.

5. It lessened the blood pressure immediately after its injection, but the blood pressure had a distinct tendency to recover soon after the injection, and finally rose to near its initial height.

6. It had an anæsthetic action as a sequel to the administration of ether.

7. Small doses (two per cent. in salt solution) did not markedly affect the motor nerve-trunk.

8. Large doses (four per cent in salt solution) quickly destroyed the conductivity of motor nerves, and subsequent washings did not recover it.

9. In frogs poisoned with urethan, the minimal irritability of nerve was still greater than that of muscle, and subsequent washing in salt solution increased the irritability of the muscles, but did not alter that of the nerves.

10. That small doses (two per cent. dissolved in salt solution) abolished the irritability of muscle, but that washing in salt solution so far restored the irritability.

11. That large doses (four per cent in salt solution) almost entirely destroyed the irritability of the muscle, and that subsequent washings in salt solution only slightly (and in many cases not at all) tended to restore the irritability.

12. That small doses (5 to 10 grains) increased the excretion of urea.

13. That large doses diminished the excretion of urea.

14. That the fluid constituents of urine were slightly increased while it was administered.

15. In one case the urine was slightly alkaline after doses of 20 and 40 grains.

16. That the skin, with large doses, showed a tendency to perspiration and flushing.

17. That it had no effect on temperature.

18. That no hypnotic effect was produced in good health, even in large doses.

19. That its prolonged exhibition tended to cause loss of appetite, and that vomiting occasionally followed its continued administration.

20. That in cases of insomnia, it was somewhat unreliable.

21. That the sleep which followed its administration, was tranquil, pleasant and natural.

22. That no confused feelings were experienced when the patient was awakened during the action of the drug.

23. That it was not contra-indicated in cases in which a slight degree of pain was present.

At the same meeting Dr. T. Cranstoun Charles stated that he had found paraldehyde to be a most excellent hypnotic. It acted promptly and safely, was not cumulative in its action and did not readily lose its effects ; it appeared also to strengthen the heart's action and to diminish the frequency of the pulse. The only objections to its use were its disagreeable and nauseous taste, and the odor it imparted to the breath. He had never noticed the hæmoglobinuria which had been stated occasionally to occur under its use. To one patient of his, it had been given for the last seven months with the greatest advantage ; he had also taken it himself with the most beneficial results. Rarely had its action been followed by headache or digestive disturbance of any kind. Whiskey had served as a very good vehicle. To students who had been afflicted with general wakefulness during examination time, it had proved of great service ; and two students who obtained distinguished places in the recent Indian Civil Service Examinations, and who had become almost sleepless, used it with the greatest advantage during the greater part of the time these examinations lasted.

As to hypnone, although when it produced sleep this was deep and lasting, yet it failed so often in his hands that he had given up administering it. Besides, it was nasty to take, may irritate the stomach and imparts a bad odor to the breath. In some cases of simple insomnia, however, it acted fairly well and gave very good results in some phthisical patients.

The action of amylene hydrate gave great satisfaction, sleep generally being produced rapidly and lasting six to twelve hours. Burgundy and sugar were good vehicles. The respiratory and cardiac activities were not affected, neither was the digestion. It acted well when combined with morphine for the relief of sleeplessness associated with pain. In cases of sleeplessness with delirium tremens, melancholia and phthisis, it was very useful ; indeed, it sometimes appeared superior to paraldehyde, which it excelled, in that its taste was not so repulsive nor the odor imparted to the breath so unpleasant. There was rarely any disturbance of the appetite or bowels produced, and in a case of fatty heart, in which urethan had entirely failed, it succeeded admirably. It slightly diminished the reflexes, slowed the heart, lessened the blood pressure, quickened the respiration and in one or two cases lowered the temperature. On the whole, therefore, Dr. Charles had found it most satisfactory as a hypnotic.

Urethan, on the other hand, frequently disappointed in its action. In addition to its want of energy in many cases, it frequently brought about gastric disturbances. In himself light and imperfect sleep was produced by 45 grain doses in about 12 to 15 minutes after a short stage of slight excitement, lasted six hours and a half on an average, produced no headache, and the presence of the drug could, after waking, be detected in the urine. In cases of delirium tremens it was of no value, but was fairly useful in the sleeplessness of children and in some cases of melancholia.

Methylal acted efficiently in a few cases of sleeplessness, with gastric or intestinal irritation. The blood pressure was slightly lowered and the respiration slowed.

Hydrate of butyl chloral had proved most serviceable in his hands in a case of Bright's disease, with hypertrophied heart, in which chloral had produced alarming results. No depressing action on the heart apparently occurred under its action. It was particularly useful in the sleeplessness associated with headaches, facial neuralgia and certain uterine derangements. Combined with sodic or potassic bromide and cannabis indica, it occasionally gave splendid effects, particularly where the insomnia was attended with high arterial tension.

Sulphonal, however, was the hypnotic Dr. Charles had been using most frequently of late, and with the best results. The sleep was produced slowly, as a general rule, sometimes very many hours even elapsing before any hypnotic action was manifested; but the sleep was both light and refreshing, and no deleterious effects were produced on the circulation; the arterial pressure was slightly lowered, though in three cases a subsequent slight rise was noticed; indeed, the only bad after-effects appeared, as a rule, to result solely in cases where the dose had been too small. In one case alone, that of a nervous girl, aged 16, had he observed any serious after-effects—headache, hysteria attacks, some hyperæsthesia, with thickness of speech, giddiness and temporary loss of power in the muscles of the legs showing themselves. In the sleeplessness of phthisis it acted well; in simple insomnia, in the insomnia of Bright's disease, in that accompanying intercostal neuralgia and delirium tremens, and in a case of mania where chloral and paraldehyde had failed, in all it gave the fullest satisfaction.

In a case of epilepsy, with motor spasms and sleeplessness, and in the case of a betting man after races in which he had lost heavily, and where there was delirium with great excitement, subcutaneous injections of hyoscine (1-400 grain) rapidly produced deep sleep, preceded by a short stage of stupor.

In a few cases—nervous palpitation, hysteria, urogenital excitement—much benefit had also been gained from monobromated camphor; while in the sleepleesness of business men a late supper of beer and salad, sometimes the slow sipping of beer containing lactic acid, the administration of strychnine in small doses, the bathing of the feet in hot wates and of the head in cold water, or the application of a hot water bag to the abdomen, often induced the wished-for sleep most happily and effectually.

Dr. Needham (Gloucester) considered urethan to be of very small use, a very mild hypnotic and very uncertain; sulphonal to have the disadvantage of being uncertain in its action, insoluble, and extremely liable to produce derangement of the digestive organs. He regarded paraldehyde as one of the most valuable hypnotics in use, generally certain in its action, causing no constipation, no loss of appetite, no decrease of weight. The dose should be fairly large—not less than a drachm—and should be repeated. It calmed excitement and produced sleep, and expedited the recovery of patients in insipient cases of insanity, and from an acute insanity in its more advanced stages. The taste was covered largely by fluid extract of licorice. If long continued, it was liable to cause irritation of the mucous coat of the stomach.

Mr. J. P. Richards (Hanwell) had found urethan practically useless, and had never found it act as a sleep-producer in the insane. On the other hand, paraldehyde had had a most marked hypnotic action in cases of acute or delirious mania, but even in these he had found that the dose had to be a large one in the first instance, and repeated by a smaller one at a short interval. In many cases of delirious mania, he had fried in vain the usual hypnotics; sleep would not come. He then, as a last resource, gave a pint of Scotch ale with the desired effect ; the patient had had a refreshing sleep, and had awakened practically recovered.

Dr. H. Woods said that chloral hydrate was so excellent a hypnotic that one of its compounds might probably be found which would be free from its defects. The principal of these were bad taste, depression of the heart and slight analgesic influence. Chloral hydrate was frequently prescribed with one of the bromides, and he was of the opinion that in such a mixture we had a definite compound formed. If the drugs were mixed in molecular proportions, the change was complete. Chloral hydrate mixed with ammonium bromide in solution appeared to form a compound which he might call ammonium trichlorethidene bromide (chloral hydrate being trichlorethidene alcohol). The above compounds decomposed in the solid state ; but if chloral hydrate was dissolved together with ammonium bromide in molecular proportions, a liquid of a fairly good taste was obtained, which he found to be very free from depressing action on the heart, and which had a more definite analgesic effect than chloral. He found such a combination most effective in simple insomnia, and very harmless.

Dr. Gordon remarked that he had found valuable results from the action of paraldehyde in doses of 1 to 3 drachms ; that it procured quiet, refreshing sleep, and that little gastric disturbance followed its use, and that syrup of lemons so far abolished its disagreeable taste. He recommended the use of urethan, in doses of 30 to 60 grains, in cases where a mild hypnotic action was indicated, and where there was not evidence of much pain ; in cases of sleeplessness, in senile changes, in hysteria and certain pulmonary condition. From sulphonal he had obtained good results in many cases ; he recommended, since the drug was insoluble, that it should be given in the finest state of subdivision, and, as the chlorides had a soluble influence on the drug, to combine it with them. In one case, he noticed that the drug had a marked action over the motor apparatus, that the patient had extreme difficulty in walking, that he was giddy and that all his movements looked like those of one under the influence of alcohol. But the higher centres were not much affected ; the patient was able to answer any question, knew every person he saw, and no headache followed, although he slept 19 hours, nor was the gastric function interfered with.

Prof. Leech said, in reply, that the discussion indicated the necessity for a still more minute examination of the influence of hypnotic drugs. In order to use a drug with confidence, it was essential that we know its possible as well as its ordinary effects ; that we should know the direction in which it tended to influence all the organs, for it sometimes came to pass that an action usually little noticeable, in man at least, was exaggerated and became a marked, and it might be troublesome, feature among the symptoms produced by the drug on diseased conditions or in individuals peculiarly constituted. By knowing thoroughly the physiological action of the drug, we might not only anticipate its possible evil influences, but might to some extent guard against them. Hence the great value of such work as that done by Dr. Gordon, to whom the thanks of all engaged in therapeutics were due. On one point his experience of urethan differed from that of Dr. Gordon, who had not been able to find that urethan produced sleep in healthy people in daytime. Doses of 2 drachms had seemed to him (Dr. Leech) distinctly to induce sleep to healthy people in the daytime. It was not, of course, easy to say whether sleep which followed a drug was due to the drug or not, but he had seen sleep so often occur in those who had taken urethan, while it did not occur to those in the same ward who had taken nothing, that he could hardly doubt that the sleep was the effect of the drug. It must be remembered, however, that sleep tended to follow quickly after urethan ; and if prevented, as it easily might be, it did not occur again. Hence it so often happened that no sleep followed this drug's administration ; its chief use, indeed, was to accentuate the tendency to sleep. The experience of Dr. Gordon that repeated doses of urethan caused sickness was interesting, and coincided with the results noted in the paper in one case. With regard to sulphonal, it seemed, from the remarks which had been made, that this drug was capable of producing more unpleasant effects than had been supposed. Great difference of opinion appeared to exist as to the effect of this drug on the stomach, and it seemed just possible that different specimens of sulphonal might differ in the character of their effects. The difference in the effects noted from the use of hyoscine most probably arose from changes which occurred in the drug itself, but tropein compounds were apt to undergo spontaneous changes ; sulphonal was not. The experience of one speaker that ale was a useful hypnotic at times, was quite in keeping with the views held by pharmacologists as to the influence of the alkyls, of which the sedative principle of the ale, is one of the best known compounds. With regard to the use of bromide combinations, which had been mentioned, it seemed probable that our most prized hypnotics of the future would be those not containing halogen elements, since those elements tended to give combinations in which they were contained too great a depressant effect on lower nerve-centres and on muscle.

The discussion on the new hypnotics was opened by Dr. Leech, who read an elaborate paper as to the value of these remedies, the greater part of which has already been laid before the readers of the *Gazette*. We will simply add, that from his own observations the order of hypnotic potency seems about as follows :

1. Sulphonal.
2. Amylene hydrate.
3. Paraldehyde.
4. Urethan.
5. Methylal.

He stated that none of these drugs equal chloral hydrate in the certainty of their action, although it is true that both sulphonal and amylene hydrate may succeed where average doses of chloral have failed.

REFLEX OCULAR AND FACIAL SYMPTOMS OF NASAL DISEASE.[2]

BY EDWARD S. PECK, A.M., M.D.

The subject of reflex neuroses or of distant reflexes of the nervous system, has always been an interesting one ; and it will so continue, as long as there remains any region of disease which fails of coming under the law of localized areas of nervous force, or of being subordinated to distinct nervous impulse. To be able to discuss intelligently the *fons et origo* of symptoms of disturbances of one organ, by means of disease located in another organ, possibly quite remote, is quite in the scope of the topic under consideration. It rather disarms our faith in the old physiological law of direct nerve-irritation to be told of pathological phenomena appearing in a part remote from the source of irritation ; but you will agree with me in the truth of this possibility by multiple illustrations taken from symptoms in the face and mouth of disease that is purely, and without question, dental. On this subject the literature is quite meagre. I am astonished to find that twenty years ago a most able authority[1] in dental literature hinted at dental reflexes, when he said that neuralgia is not a disease, but simply a phenomenon, or the expression of an immediate or distant lesion.

The first inquiry in neuralgia, he writes, is to search for the cause, which is by no means evident ; it exists, and in many instances nothing short of a thorough search will reveal it ; when, to argue effect from cause, we will find that principles must be deserted, physiological theories must be abandoned, even anatomical relations and connections must be forgotten ; and the neuralgic expression must be treated " with the hope of an accidental success."

As graphic examples of the phenomena of distant and perispherical neuralgias, there may be cited otalgia, hemicrania, or even sciatica, as a result of an exposed tooth-pulp, or of pressure from an exostosis. It is undoubtedly a familiar fact as with the author, that the extraction of a canine, or bicuspid, or molar tooth, relieves, neuralgia of the face, odontalgia occurring in consequence of menstrual irregularities, megrim, and even neuralgia of the nates and thighs. As further instances of dental reflexes, and more pertinent to the scope of this paper, may be mentioned the neuralgias found in the infra- and supraorbital nerves, the globe of the eye, the temples, and particularly in a spot near the versex, a little to that side of the median line on which the affected tooth is found. Catarrhal affection of the middle ear has been caused by carious teeth ; so, too, amaurosis by the crowding of teeth. All these and more are cited as examples of dental reflexes.

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[2] Read at the stated meeting of the New York Odontological Society, February 18, 18.0.

[1] Garretson, "Diseases and Surgery of the Mouth, Jaws, etc." Philadelphia: Lippincott & Co., 18 .9.

There are, however, as every dental surgeon knows, many instances of distant neuralgia, which neither extraction nor filling of the properly-selected tooth will alleviate.[2] These instances can only be explained, according to Von Recklinghausen, by the irritation of the spheno-palatine ganglion and superior maxillary nerve. The alveolar border of the teeth possesses a rich kingdom of nerves —the anastomosing filaments of the anterior and posterior dental nerves. How often do we see teething children, and children suffering from caries of the upper back teeth, who have at the same time discharges from the nasal mucous membrane, with swelling of the inferior turbinated bones and adjacent parts of the septum nasi, and with possible elevation of temperature?

In isolated cases the same connection is found between dental cysts, alveolar swellings, pathological growths from the teeth into the buccal cavity, or into Highmore's antrum, abscess-formations of tooth-roots, etc., with swellings of the nasal mucous membrane, of the lips, or cheeks. In some of these isolated cases the only way to destroy the persistent neuralgia, or to prevent their insidious recurrence, is by means of the galvano-cautery, or chemical caustic to the nasal mucous membrane.

So far as I know, the first one to call the marked attention of specialists to the dependence of conjunctival catarrh upon nasal and pharyngeal catarrh was Bresgen,[1] in 1881. Arlt, of Vienna, had dwelt upon the close connection between stricture and chronic inflammation of the lachrymal duct and diseases of the mucous membrane of the nose for many years in his admirable clinical hours with his students. From earliest time it has been known that, if an eye were injured, or suffered from the lodgment of a foreign body upon any of its coats, more especially upon the cornea, the worst phenomenon is a one-sided "snuffle," or a sudden rhinorrhæa. This is not merely an increase of tears, because a sudden hyperæmia of the nasal mucous membrane of the same side follows. The introduction of a Eustachian catheter, in its passage over the floor of the nostril, and opposite the anterior and middle parts of the inferior turbinated bone, is immediately followed by a flow of tears from the corresponding eye; after the catheter has passed this short tract, the sensation produced by it is confined to the posterior part of the nasal strait, and is not accompanied by any ocular symptoms. This gush of tears cannot be explained by a stoppage of the nasal end of the lachrymal duct, for the tears are not conveyed with such rapidity into the duct; and, moreover, the overflow on the side of the catheter-introduction is immediately succeeded by a flow of tears from the other eye.

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[2] Ziem, "Bedeutung d Zahnkrankheiten fur d. Entstehung v. Nasenleiden." *Allg. Med. Centr. Zeitung*, September 2, 1885, p. 1117.

[1] Der Chronische Nasen u. Rachen Katarrh, 1881, Band 1.

These and similar physiological phenomena led Bresgen, Hack, Ziem, and later, Gruening, Rumbold, Rothholz, Bosworth, etc., to observe certain ocular symptoms consequent upon nasal disease. Hack's paper attracted universal attention, and, while it was at first received with quiet favor on account of its source, soon invited unsparing criticism and strong opposition from the Berlin Medical Society, where it was first presented. Hack found a large number of ocular disturbances that would not yield to proper local treatment; and, in looking about for a definite cause, found not infrequently a series of nasal symptoms, which one author[1] has grouped together under the homely phrase of "irritable nose." These symptoms were stuffiness of one or both nostrils, usually of the one corresponding to the affected eye; a catarrhal discharge; local nasal irritation, usually described as in the lower and middle parts of the nasal fossa, and inability to breathe freely through the nostril. Exploration with the nasal probe produced an engorgement of the mucous membrane of the anterior extremity of the inferior turbinated bone, and sometimes a puffing of the corresponding portion of the septum. This touching with the probe was like touching a puff-ball. It was found that the submucous cavernous tissue had undergone irritation, had become spongy, enlarged, and erectile.

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[1] Gradle, *Archives of Ophthalmology*, December, 1887, p. 391.

The ocular disturbances physiologically produced by this manœuvre were lachrymation, fear of light, known by the term photophobia, itching of the lids, a more or less bloodshot appearance of the conjunctiva of both lid and ball, and sometimes an injection around the cornea; more or less pain accompanied these symptoms. Hack regarded these disturbances as paroxysmal and reflex. The question of reflex irritation, therefore, was not so much one of enlargement and engorgement of nasal tissue and of obstruction of the nostril, as of the remote effect upon the eye. This is also illustrated by the familiar effect of sneezing, of the sudden entrance of foreign bodies into the nose, of twitching out hairs from the nostril, etc., whose prompt effect is to suffuse the eyes with tears, and to produce ocular congestion.

It would be improper to consider the pathological disturbances of the eye, as the possible result of nasal disease, without excluding certain groups of diseases which must be regarded as determining their own manifestations; as, for instance, all forms of direct traumatism; all scrofulous and syphilitic diseases, whose import is shown quite as much in the skin, glands, teeth, etc., as in the nose or eye, and which may be expressed in one or all of these different systems simultaneously, or consecutively, without any reflex element whatever. For instance, the occurrence of a one-sided ophthalmia, of necrotic ulcers of the cornea, or of an iritis, during an attack of scrofulous rhinitis, or of ozæna, or of nasal ulcers and eczema, cannot be regarded as reflex; it is also a well-known fact, that wounds of the cornea of the eye are very apt to become suppurative, necrotic, and perforating during the contemporary existence of an ozæna, but it is not reflex. A more intelligent view of such coincidences is that they are mutually dependent upon a central systematic cause, and their removal depends upon a persistent fight with this central lesion. It is doubtful, in such coincidences, which disease is the starting-point of the other; in fact, it is best to regard them as independent of each other, and to treat them simultaneously as symptoms of a general cause. Every physician has

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[1] Rothholz, *Deutsche Medicinische Wochenschrift*, December 29, 1887, p. 1123: "Ueber die Beziehungen von Augenkrankh, zu Nasen-affectionen."

cases in which such a connnection or coincidence exists ; and in the elimination of those that have no connection with each other, lie the genius of diagnosis and the success of treatment.

The pathological disturbances of the eye and face which may be regarded as belonging to the category of reflex symptoms, due to nasal disease, are as follows : lachrymation ; congestion of the eyeball and lids ; floating bodies in the vitreous humor of the eye ; phosphorescences in the eye ; itching and scratching of the inner surface of the lids ; eczema at the margin of the lids ; a fullness of the lids just behind the bases of the cilia, and to be contradistinguished from the puffy œdema of albuminuria ; eye-strain, or eye-tension, described by patients as if a tight band, all too short, held both eyes together, or as if a band fixed the eye in the orbit, making its motions painful ; weakness of sight, known by the term asthenopia, the result either of a weak muscular apparatus, or of imperfect accommodation for near objects ; headache, either temporal, vertical, frontal, or cervical, chiefly the two last varieties ; spasm of the lids ; choreic movements of the lids and eyeballs ; neuralgia of the supraorbital, infraorbital, and canine regions of the face ; pain, tenderness on pressure, and swelling over the region of Highmore's fossa ; functional epilepsy, manifestly due to reflex influence ;[2] nausea and gastric disturbances ; a diseased condition of the upper digestive tract ; uterine disorders ; genito-urinary affection ; perversions of smell, taste, and hearing, as well as of sight ; laryngeal cough ; bronchial asthma ; megrim ; melancholy, etc. Since Voltolini first observed the reflex connection between nasal polypi and asthma, between sneezing and asthma, between sneezing and spasmodic cough, a great deal of attention has been paid to laryngeal and nasal reflexes. In 1880, Zuckerkandl, of Vienna, made a careful examination of one hundred and fifty skulls, with reference to the existence of catarrhal inflammation in the cranial sinuses. He found that the sinus, or antrum, of Highmore, is most frequently affected with catarrhal processes ; after that the sphenoidal sinuses ; and *least frequently of all*, the frontal sinuses.

The following cases will serve as illustrations of some of the reflexes named. They are selected from a varied array, for the emphasis of special symptoms.

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[2] Elsberg, *Archives of Laryngology*, 1883, iv. p. 253.

A married lady of thirty years, mother of one child by a normal delivery, succeeding to a miscarriage by two years, occupation that of care of an easily-managed household, with time and inclination to cultivate herself, to a limited extent, in music and literature, enjoying otherwise good health, came to me in October, 1888, complaining of blurred vision, and floating specks chiefly in the left eye; itching and scratching of left lower lid; pain between the eyes; a cincture-band around the forehead; headache after using the eyes for sewing and reading, and on the following nights an aggravating insomnia. Correction of a hyperopic astigmatism with proper glasses brought vision to the normal, and an eye-drop of one-half per cent. of cocaine-hydrochlorate and one grain of zinc-sulphate improved the congested and granular condition of the lids. The remedies were sufficient for a time. Soon, however, the frontal ache and cincture-band, with the insomnia, asserted themselves more strongly, and my attention being directed to her nose and throat, I found a catarrhal rhinitis, chiefly of the right nostril; a deviation of the septum, partly of osseous and partly of cartilaginous tissue, into the same nostril; a puffing of the mucous membrane of the right wing of the nostril, opposite the septal malformation; the two entirely filled up the middle and superior meatuses of the nostril, but the nasal probe could be easily passed between them to the post-pharyngeal wall; the puffy alar hypertrophy was very sensitive to the touch, and fairly rough usage of the probe immediately produced a flow of tears, with a pericorneal injection of the same eye. Under the belief that cocaine ought to assist in establishing a connection between the nasal disturbances and the ocular symptoms, a four-per-cent. solution of cocaine was freely used, with the effect of a partial retraction of the alar hypertrophy, but with only slight abatement of the ocular symptoms. A systematic treatment of cocaine-spraying and pencilling was then used, together with Dobell's solution of borax, bicarbonate of soda, carbolic acid, and glycerin, with considerable relief of the nasal sensitiveness and of the ocular symptoms. It was not, however, until the osseo-cartilaginous spur was freely removed with a saw, that freedom from distressing symptoms could be asserted. This was done with a ten-per-cent. solution of cocaine, applied for fifteen minutes with a camel's-hair pencil, and on a cotton probe. The sawing was with an upward movement, and brought away quite a large triangular spur of the septum. Frontal and ocular symptoms disappeared, followed by complete absence of insomnia.

This case may be regarded as a fair example of distinct nasal and ocular diseases, at once dependent upon, and independent of, each other. The refractive error of hyperopia was certainly distinct from the nasal disease; and, following the law of such optical anomalies, it was due to an anatomical defect of the eyes. But its careful correction did not relieve the patient of the reflex ocular symptoms, whose origin was in the nose, and which finally disappeared with a removal of the offending nasal obstructions. In the simpler forms of nasal mucous-membrane hypertrophy a resort to operative procedures is usually unnecessary. Cocaine, in a two or four-per-cent. solution, when well borne, with Dobell's spray, or Seiler's antiseptic pastilles, and, if necessary, chromic acid as a caustic application, will in a large number of cases suffice to effect a cure. As to operative procedures, it is to be remembered that the nostrils are not symmetrical in two-thirds of all the cases, and that not every deviated septum is to be "shaved off," or "sawn off." The practice of "rifle-boring" a nostril, or making it as "clean as a gun-barrel," is to be condemned. It is to be borne in mind that the nose receives the first air that is destined to pass into the lower respiratory organs; and sufficient area is needed in either nostril to allow of its free passage, otherwise the mouth must be opened to assist in respiration, and thereby the faulty habit of mouth-breathing will be acquired; it is also to be borne in mind that the nose is the organ of smell, and destruction of excessive nasal tissue, especially of that of the bony septum, is not in the line of good surgery, on account of its interference with this function.

Another case is as follows: A man of forty years, of large physique and bony frame, never having had syphilis, and apparently in perfect health, by occupation a teller in a bank in the northern part of this State, had suffered for some years from conjunctival catarrh of both eyes, and had worn glasses with the idea of relieving eye-strain while at work upon the books. He was a mouth-breather, with enlarged tonsils, chronic follicular pharyngitis, false noises heard in both ears, slightly but not noticeably deaf, had central frontal headache, especially at the close of the day's work; in addition, he had hay fever for a limited time during the summer. Cocaine in weak solution had been used upon his eyes, giving temporary relief. Having fallen into good hands, he found himself the unfortunate possessor of "sensitive areas" in each nostril, which had been touched with the red-hot platinum wire. I found that, though there was an improvement in the size of the nasal straits by the removal of the alar hypertrophies, there remained a large deviated septum into the left nostril, which, at its middle and posterior parts, was sensitive to the touch of the probe, and somewhat puffy. Under thorough local anæsthesia this was sawn from below upward with some difficulty, and the major part of the obstruction was removed. The result has been a return to normal breathing by the nose, an abeyance of the false aural sounds and of the stuffy feeling of the ear, eye-tension and discomfort have dissapeared, and glasses have been laid aside.

I shall cite one more case of perhaps greater dental interest, wherein relief failed to come by means of the methods heretofore indicated, and then close these observations upon this interesting topic.

A New York merchant of nearly thirty years of age, whose father is engaged in large manufacturing interests, and who himself was engaged in buying raw materials, in office-work, and in shaping national legislation in regard to import duties, whose duties, therefore, were varied and responsible, but not specially trying to his eyes, was sent to me in January, 1887, by a dentist, with a history, concisely stated, as follows: Patient had had intermittent pain in the fifth pair of nerves, chiefly over the superior dental nerve, and in the canine fossa, running up through the superior lateral incisor teeth; this pain was now on one side and now on the other; bilateral temporal pain and discomfort, chiefly over the right temple, on which side was chiefly located the canine pain; pain behind both eyeballs. In March, 1886, he fell twenty feet in the gymnasium of one of the athletic clubs of the city, and broke off both lateral incisors of the upper right side, and injured the nose, though no fracture, not even of a cartilage, of the nose was found. The teeth were beautifully crowned with porcelain, backed by gold, so that the fractures were not perceptible to ordinary observation; he had a catarrhal conjunctivis, granular and dry; asthenopia, with the slightest use of his eyes for the near; occasional insomnia; frontal headache; no appetite for breakfast, and was melancholy; he had never had rheumatism nor syphilis; did not drink, and retired early. He had been under treatment by several oculists, and had been observed by several dentists. Just before coming to me he had been under the care of a skilful oculist, who found occasion to interfere with the nares by repeated cauterization of the nasal mucous membrane. A weak lens had been worn, but the patient complained of its interference, and that it gave him no relief. Early in 1886, nausea and gastric disturbances were relieved by an astigmatic lens, but the astigmatism had disappeared, while the headaches had grown worse. On examination, I found the chief objective sympton to be the conjunctivitis; the nasal fossæ were amply large, and had no unusual discharge; the canine reflexes were intermittent, and shifting from one side to the other; and the teeth were, without exception, in perfect order. No glasses improved the vision, which for distance was perfect, and I looked upon the patient as suffering from invalidism, due to nervous relaxes, and treated him chiefly on general principles. Aside from a mild local astringent to the lids, his *regime* was a change in diet, more devotion to social pleasures, a trip to Washington, followed by ten days at the carnival in Montreal, etc. During these diversions he was much better as to the ocular symptoms, especially as to the bulbar pain, and his appetite returned. This improvement lasted for about two months, when the symptons above mentioned recurred, and he sought other sources of relief. I have authentically learned since that a distinguished oculist had made a partial tenotomy of the internal rectus muscle of each eye, and that the patient was free from the incubus of nervous reflexes and had gained thirty pounds in weight.

This case is introduced to show the possibility of dental, nasal, and ocular reflexes concurring, and the elements in doubt in making an eliminative diagnosis. It further affords an illustration of the doctrine of the "survival of the fittest."

Before closing this paper, I desire to call attention to the dangers of overestimating reflex disturbances. That they exist, and that they are local expressions of nerve disturbance, as suggested here, of the fifth pair of nerves, cannot be denied. But that they are the necessary initial step of a future neurosis, such as chorea, epilepsy, or paralysis; is not true. It is always easy for the specialist to find symptoms that conform to a new and attractive theory of pathalogical phenomera; for new theories present an air of diversion and relief that is always refreshing. In the special subject under consideration, as in all references to nervous phenomena, it is a safe rule to keep before us the necessity of the healthy nutrition, both physical and moral, of the nervous system of our patients.—*International Dental Journal.*

CLINICAL LECTURE.

CLOSURE OF VULVA FOR VESICO-VAGINAL FISTULA.—FIBROID TUMORS.

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CLOSURE OF VULVA.

Gentlemen: This woman had her first labor twenty-five years ago, and is now fifty years old. She lived then in the country, and was four miles from the nearest physician. She fell into labor—her first and only one—with a shoulder presentation. Much delay took place before the doctor reached her side, and then he found that the waters had escaped, and the shoulder was so jammed down that he could not perform retroversion. He sent for help, and two brother physicians came to his aid; but they also found it impossible to turn the child and deliver the woman. By this time many hours had elapsed, and while they were debating the propriety of performing embryulcia, the child was turned and delivered by the rare mechanism of spontaneous evolution. Of course the child was dead; but that was not the only misfortune; for the bladder and the surrounding pelvic tissues and organs had been so seriously compressed as to cause sloughing of the womb, the whole base of the bladder, the entire track of the vagina, and all of the urethra. The vagina nearly closed up by cicatricial contraction and the urine was constantly dribbling from her person, making her very raw, bad smelling and miserable. She consulted eighteen physicians; but nothing could be done for her. Finally she came to me in 1877; and I performed the following operation with her consent, telling her that I did not know whether it would succeed or not. It consisted in making an opening between the vagina and the rectum—in other words, a recto-vaginal fistula. Then I closed up the whole vulvar opening, and thus converted the rectum into a bladder. At first the rectum so resented the presence of the urine, that she had to pass her urine every few minutes, and I was afraid that I would be compelled to reopen the vulva. But finally rectal tolerance took place, and she became able to hold her water in the rectum for six hours at a time.

For thirteen years she got on very well; but a few months ago, probably through something undigestable which she had swallowed—perhaps a bone—a small fistulous opening occured near the arch of the pubic bone, from which the urine dribbles. So she has come to-day to have it closed up. She is an opium-eater, and she looked so pale that I had her urine examined. Much albumin was found; but whether it is secreted in her kidneys, or comes from the admixture of feces in her urine, I cannot say. But we shall take additional precautions while administering the ether; for ether is obnoxious to diseased kidney, especially when caused by compression from large tumors; and we may then have arrested secretion as a result. Under such a circumstance, namely, the presence of a large tumor, I usually give chloroform.

The operation to-day will consist in simply refreshing the sides of the sinus, and then bringing the raw edges together. My assistant has just syringed out the fistulous track with a 1 : 2,000 sublimate solution, preparatory to the operation. But he forgot that the vagina communicates with the rectum, and that this antiseptic solution, while quite harmless in the vagina, is capable of doing much mischief in the rectum. So we wash out the rectum with large quantities of water, and thus get rid of the danger of having the poison absorbed.

This episode reminds me of another, which filled me with great anxiety at the time, but at which I can now laugh heartily when I think of it. Early last summer I removed a malignant growth from the cervix uteri of a woman and ordered daily douches of a 1 : 2,000 solution of corrosive sublimate: that is to say, a tablet of seven and a half grains of corrosive sublimate was put into a quart of water which was injected by the nurse into the vagina. As the patient convalesced, she would sit on the commode and would herself insert the nozzle of the syringe into the vagina. But on one extremely hot evening she unconsciously introduced the nozzle into the rectum. The nurse, not knowing how very much astray the nozzle had gone, pumped away until nearly the whole quart had been taken up. Suddenly the woman began to feel severe rectal pain, and then she realized what she had done. The nurse, although very greatly alarmed, was quite equal to the emergency. She sent in great haste for me, and at once injected quart after quart of water until the lower bowel was well washed out. I hurried the messenger to the nearest drug store for lime water, and then ran all the way to my patient's house, which was nearly half a mile distant. A quart of lime water was now thrown up into the bowel, as an additional precaution; but it was hardly necessary, as the previous repeated injections by the nurse had carried off the poison. Beyond a slight soreness of the rectum, which lasted for twenty-four hours, my patient suffered nothing. But what with the heat, the anxiety, and my hard run, my underclothing became so drenched with perspiration that I had to change them all when I reached home.

But, to return to our patient. It sometimes happens in these cases of violent injury to the soft parts from labor, that menstruation is permanently arrested. Exactly why this happens, I cannot say; but so it was with our patient when I operated on her in 1877; and I have repeatedly seen it in other cases. In one of these cases—that of an unmarried girl—I never could find the cervix uteri, so destroyed and matted together were all the pelvic organs from a neglected labor. Twice, in vain efforts to discover it by dissection, I got into the peritoneal cavity. As she had lost the whole base of her bladder, and also had a very large recto-vaginal fistula, caused by the general sloughing, I closed up her vulva, as in the patient before you. In her case also, the rectum needed education to tolerate the presence of urine. But ultimately it made a very good bladder. If my memory is not at fault, these are the only two cases in which I was forced to close up the vulva. I have, however, on one occasion closed up the womb, or rather the cervix, in the bladder, so that the woman menstruated afterwards into the bladder, and out through the urethra.

While talking, I have been denuding the edges of the fistula. These are coaptated by shotted wire sutures. In order to avoid all tension on the parts by the accumulation of urine in the vagina, I shall insert a short catheter into the rectum. These sutures will not be removed for at least a week; but if there should be a leakage from the wound they will be kept in for two weeks, so as to aid the granulating surface to close up. The wire used was No. 31, which is the finest used in gynecological work. My rule in the selection of wire is, to use the finest compatible with safety—the finest for plastic operations on the cervix and on the bladder; the heaviest for perineal tears.

The lesson which we get from this case is to act promptly in obstetric emergencies. My rule is always to interfere, and that promptly, in certain conditions. For instance, in a face presentation, if the occiput cannot be brought down to become the presenting part, I always turn. In a breech case, I make it the rule to bring down one leg; and I thus have the labor wholly under my control. In a shoulder presentation I always give ether, and turn as soon as possible, by the bimanua', or bipolar, method. The most common cause of vesico-vaginal fistula is delay in a head-first labor, after the engagement of the head. Therefore, this lesion is more likely to happen in cases of moderate disproportion than in extreme ones; for in the latter the head cannot engage, and it has to be opened before it can be delivered.

A WOMAN DRIVEN CRAZY BY NITROUS OXIDE GAS.

Mrs. Ella Targett, of 784 Amsterdam avenue, a woman of large frame, is in the insane pavillion at Bellevue. Her outbreaks give her keepers the greatest trouble, and she is almost constantly in a strait-jacket. She is the wife of George Targett, an agent for several apartment houses, and was taken by him to the hospital on July 16.

When he brought her there he said that he believed his wife's insanity had been brought on by a sitting at the dentist's, at which she had nineteen teeth drawn under laughing gas. Mr. Targett said :

" She left the house early in the afternoon, but did not return until about 9 o'clock at night. She seemed utterly broken down when she reached the house, was in a fever. For an hour I could not get a word from her as to the experience she had undergone. The aunt declared, that she had first asked the dentist if it would be perfectly safe to administer the anæsthetic, and he answered her that it would. A physician who had attended my wife before, was called in. He said she ought not to have taken gas. She grew steadily worse and the insanity, under which she now suffers, has rapidly developed. She has never been out of her mind before. We have been married eleven years."

Dr. Stuart Douglas, under whose care Mrs. Targett is at Bellevue, said yesterday that her condition is extremelv serious. " She screeches in horror at the blood and bloody visions pictured by her disordered mind, and writhes and twists with furious strength in the hands of those who seek to restrain her. The suicidal mania is strongly developed."—*Philadelphia Times, July 19.*

EDITORIAL REVIEW

Of Lawrence Turnbull, M. D., P. H. G., on "Deaths from Chloroform and Ether Since the Hyderabad Commission, with Conclusions," and the Work of the "Hyderabad Commission."

In this review, it is befitting to state that $5,000 has been spent by the Nizam of Hyderabad, of India, in experiments with anæsthetics, principally on dogs. Two commissions were appointed. One was held in 1888, by which 141 dogs were killed by chloroform inhalation, and the results of the second commission were published in January, 1890. The latter commission experimented on about 600 animals—chiefly dogs—for the purpose of discovering the safety of chloroform, ether and the A. C. E. mixture, and other relative values. In their own language, "the experiments of the committee were designed to show the effect upon the blood-pressure, heart and respiration of the inhalation of chloroform, ether and the A. C. E. mixture, administered in various ways and under varying conditions. The objects of the commission, were five in number:

1. To test the suitability and safety of chloroform as an anæsthetic. The experiments with ether and the A. C. E. mixture, were instituted principally for the sake of comparison with chloroform on certain points, and it is not pretended that they afford a complete exposition of the action of those agents on the system.

2. The effect of pushing the above-named anæsthetics (*a*) to a dangerous degree, and more especially until the respiration ceases; (*b*) until death results.

3. The modifications in the effects of these anæsthetics which result from (*a*) asphyxia in varying degrees and produced by various means (*b*) from the use of drugs, such as morphine, atropine, physostigmine and others.

4. The reality, or otherwise of the alleged liability during ordinary chloroform administration to the occurrence of primary or secondary syncope or stoppage of the heart, brought about either by shock or through fatty or weak heart, or by hæmorrhage, or by changes in the position of the body. To investigate these points, in the first place a large number of operations, which are reported

to be especially dangerous in reference to shock, were performed in every stage of anæsthesia, and numerous experiments were also made to show the effect of direct irritation of the vagus. Secondly, a number of animals were dosed with phosporus before they were experimented on. This caused the weakening of the heart by fatty degeneration of its fibres, but at the same time other complicated changes in the whole of the organs of the body, not met with in the condition known as fatty heart in human beings. On the other hand, there are conditions often found in the fatty heart, such as changes of the coronary vessels, which were not produced by the phosphorus.

5. The effect of the anæsthetics above mentioned upon different animals, more especially upon monkeys, as the nearest approach to human beings.''

As Dr. Turnbull refers to the report of the Hyderabad Committee as the exciting cause for his investigations in the same channel, I may be allowed in my criticisms to call into question the tangibility of the position assumed both by the committee and our American savant. Dr. Turnbull says: ''We will only state, in brief, the practical conclusions arrived at as to the effects of chloroform, 'that in every instance the respiration stopped before the heart,' and all that was necessary for safety was to attend to that alone. Soon after the publication of the views thus expressed, several practical English chloroformists gave their opinion, founded on professional experience, that chloroform was by no means to be considered safe by simply attending to the respiration, and that the heart still played a most important part in the deaths, as may be seen from the numerous deaths from syncope given in our tables.

''With this view, I have made a most careful collection of all the deaths both from chloroform and ether, from every available source, assisted by several friends. These forty-three deaths have been arranged in a tabular form, giving the name, age, history, nature of operation, anæsthesia (anæsthetics) used, amount used, apparatus employed, posture, how long under influence, whether heart or respiration stopped first, means to resuscitate, how long continued, post-mortem, cause of death and references.

The whole number of deaths from chloroform and ether are forty-three. Of this number, thirty-nine were deaths from chloroform and four from ether. In five cases, the cause of death was syncope from chloroform, and in thirteen cases the heart stopped first. In ten cases the respiration stopped first and in four cases the heart and respiration ceased at the same time. In one case cyanosis; no pulse. In twelve of the cases it is not stated which stopped first."

It will be readily seen that the chief aim, both of the committee and Dr. Turnbull, in their investigations was to discover which stopped first performing their functions, the *heart* or the *lungs*. But did they attempt to point out the source and the channel of the force that moves these respective organs and enables them to perform their functions? Do they tell how this force may be withheld or interrupted, and the functions of life prevented? Do they point out the real cause of these fatal results? What practical knowledge do they furnish the reader? They speak of pushing anæsthetics to a dangerous degree, but fail to tell what constitutes this dangerous degree; or until respiration ceases, but fail to point out the cause that prevents respiration; or until death results, but fail to trace to the cause that produces this result.

Is it not manifest that both Dr. Turnbull and the committe fail to discriminate in the precise physical conditions that are properly recognized as asphyxia and anæsthesia, and consequently fail to recognize the cause or essential definite agency that produces either of these physical conditions. Why not come down to the study of *bed rock* or first principles? Never a result without a cause. The *heart* and the *lungs* do not perform their functions without the essential force is communicated to them. Whence cometh that force, and how may it be interrupted? It will not do to say that life is that force, and that we cannot know what life is. *Life* is not *force*, but *force* makes manifest *life*.

Scientists agree that all force is a unit. Heat, light, electricity, neural force, etc., are simply different manifestations of this unit. Different forms of presenting the same element, correlated, convertible into each other. Life may exist both in the animal and vegetable kingdoms without any manifestation, but the *force* of life may make life manifest by putting in action the organs of life. Then whence cometh this force and through what channel is it conveyed to these organs? Who will question the fact that the *force* of life is *free oxygen*, or that free-oxygen is that out of which vital force is generated by the pneumogastric and the cerebral glands? It may be called *nervo-vital fluid* or animal-electricity. This electricity or electric force can only be developed and made manifest when free oxygen is the *basic element*. That free-oxygen is supplied in and through the atmosphere to the lungs and brain. It is taken up by the blood and thus conveyed to the cerebral glands. The brain may be considered the electric battery, generating thus this animo-electricity. The *nervous* system is the channel through which this *vital force* or animo-electricity circulates and makes manifest the functions of life. The motor nerves communicate from the brain to the periphery of all the organs, and the sensory nerves communicate from the periphery to the brain, or great heart of the nervous system. The circulation of this electricity or nervo-vital fluid is thus sent out through the vaso-motor nerves and returns through the sensory nerves, just as the blood is sent out from the heart through the arteries and returns through the veins.

This is more fully explained in an address delivered to the Cincinnati Medical Society, given in this number of THE MICROCOSM, to which we invite the reader's attention for a better understanding of this subject. The mind may be regarded as the governor or regulator of this battery. At the behest of the governor this nervo-vital fluid or electricity is sent out to make manifest the functions of these organs, and thus we are enabled to talk, walk and perform the duties and functions of life. This circulation may be interrupted either by an internal agent or by an external agent, and in no other way. The internal agent is the mind; the external agent may be chemical or mechanical, and they will produce very similar results, as explained in the address referred to. Hence, whether the heart, or the lungs cease first to perform their functions depends upon the action of the controlling agent; but the controlling agent may be the mind, or it may be the agent administered to the patient. The one is *internal*, the other *external*, but both produce similar results. The neural current will continue in normal force and the functions of life be continued, unless interrupted, either by the action of the internal agent, or the external agent. If by the internal, the result is revulsion in neural circulation or concussion and then revulsion, by which you have either partial paralyzation or *complete* paralyzation—syncope or paralysis. If by the external agent, you may have first asphyxia and then paralysis of the heart, or you may have paralysis of the heart direct, by producing concussion, revulsion and thus suddenly arresting the neural current. But asphyxia can only be produced by excluding the free oxygen that is necessary to support combustion and sustain life. Any agency that does not contain enough air to supply in due quantum free oxygen to sustain life, can only produce asphyxia. It is estimated that to produce asphyxia, the oxygen in the blood must be reduced to about two per cent. This may be accomplished by over-charging the air with either chloroform or ether, thus crowding out the necessary amount of free oxygen to support combustion and sustain life, and when that is done you have asphyxia, and the lungs always cease their functions first when death is preceded by asphyxia, but when produced by concussion from the chemical effects of an over-percentage of the chloroform or ether, or by what is commonly called a shock, then the heart is first paralyzed.

This is unquestionably true, and I *challenge* any *man* to prove anything to the contrary.

In anæsthetics the force and functions of life must be in continuance *under modification* whereby an absence of sensation is induced.

In asphyxia the *force* and *functions* of life are suspended or abrogated, whereby an absence of sensation is attained. These two physical conditions are entirely different and opposite in their tendencies, and if Dr. Turnbull and the Hyderabad Committee, had properly discriminated and diagnosed these physical conditions—the *causes* that produce these widely different conditions—they evidently might have been spared much tedious labor and brought to light much more knowledge that would have been of more practical benefit to the medical and dental professions.

[TO BE CONTINUED IN NEXT ISSUE.]

EDITORIAL.

IMMEDIATE REMOVAL OF PULPS.

MUCH has been said of the various methods of removing pulps and nerves, and yet *more* remains to be learned of the manner of operating to secure the best results. Formerly the writer used principally arsenical paste to devitalize the pulp, but after a time abandoned its use almost entirely, having discovered that during the process of devitalization, there was a coagulum formed in the dentine which invariably discolored the teeth, and that the arsenic would more or less devitalize and injure the adjacent *periosteum* and alviola and cause frequent soreness and sometimes necrosis of the alviola and bone.

In later years, I have practiced the extirpation of the pulp and nerve with the patient under the influence of my anæsthetic, and the immediate filling of the roots and teeth with the best of results. By this process the teeth will remain white and the *periosteum* and alviola in healthy condition.

I do not produce profound anæsthesia; but carry my patients ordinarily into the second stage of anæsthesia; then with a sharp bur cut out the pulp. I then inject with syringe some of my Hypnotic with about two per cent. of carbolic acid until I have broken up and washed away the nerve filaments. When I take a piece of orange wood and dip it into a solution of chlora-percha, having shaped it to fit the nerve canal and drive it up to the apex of the root and immediately fill on top of that with the best results. The use of the nerve broach is barbarous and unnecessary. Besides, the severe pain, it leaves the living nerve in the jaw disturbed, and a soreness that is sometimes exceedingly annoying.

THE publication of this number of the D. & S. MICROCOSM, has been delayed *unavoidably* on account of the type-setters strike, and we trust that we may not again meet with alike fate. Our subscribers will, we trust, kindly overlook this short-coming.

WE return thanks for the many complimentary expressions from the press and from individuals, both in the medical and dental profession, as well as for the many subscriptions, for the D. & S. MICROCOSM.

IT is certainly, exceedingly gratifying to know that the first and only journal in the world devoted chiefly to the science of Anæsthesia, Anæsthetics and Surgery in their co-operative relations is so heartily welcomed and highly appreciated. This is the strongest evidence that could be given that THE DENTAL AND SURGICAL MICROCOSM is supplying a *long felt want*, and we shall endeavor to make it an efficient harbinger for the establishment of the Science of Anæsthesia, on *true bed-rock principles*. If, in our efforts to thus establish the science, we lay the axe at the root of the tree of old theories and teachings, we shall be generous and courteous enough to give space for the defence and establishment of truth at all times. Light and truths pertaining to the science, is earnestly sought and welcomed by the D. & S. MICROCOSM, and those who are in search of light pertaining to this important, yet infantile science, cannot afford to do without THE D. & S. MICROCOSM, and by your individual subscription you will assist in developing and revolutionizing the science.

HAVING received a pamphlet entitled, "Deaths from Chloroform and Ether since the Hyderabad Commission, with Conclusions," by Lawrence Turnbull, M. D., P. H. G., of Philadelphia, with the author's compliments, for which we return thanks, we will promise the Doctor a careful reading and a review of the same, the beginning of which may be found in this number of THE DENTAL AND SURGICAL MICROCOSM, to which we invite the readers attention, as well as to the paper of Doctor Turnbull, upon which the doctor has spent much time and in which he has given some valuable information. This paper was read in the Section of Surgery and Anatomy, at the Forty second Annual Meeting of the American Medical Association, held at Washington, D. C., May 5-8, 1891. Dr. Turnbull is the author of a well-known work on "Anæsthetics and Artificial Anæsthesia."

SUIT FOR SLANDER.

Dr. C. H. Land, of Detroit, Mich., has begun suit for slander against Jonathan Taft, M. D., D. D. S., dean of the dental department of the University of Michigan, placing damages at $50,000.

Dr. Land claims that in taking such action it is not in a spirit of malice but of common justice, and that Dr. Taft has, for many years, been the strong advocate of a false code of ethics, which has no legal status, in which he has finally gone so far as to make himself personally liable. As all dentists and physicians are likely to be interested in the outcome of this suit, since it will go far in determining the status of the respective codes of ethics, and the legal rights of any association, we shall keep our readers posted and now give the following correspondence and Dr. Land's statement of his cause of action.

DETROIT, MICH., July 7, 1891.

Prof. J. Taft, Cincinnati, Ohio :

DEAR SIR—By several of the students in the senior class of the University of Michigan, I have been made aware that you have announced before the class that my methods of doing business were "Quackish." Am I correctly informed? If so, it will be no more than justice to expect from you an explanation, and upon what ground you expect to sustain so unkind an insinuation.

When you have found it convenient to call at my office, my whole aim and purpose inclined me strictly to treat you as a gentleman, and I trust you may be able to give a different construction on the rumor that I may always have the utmost regard.

Yours truly,

C. H. LAND.

CINCINNATI, OHIO, July 14, 1891.

Dr. C. H. Land, 271 Woodward Avenue, Detroit, Mich:

DEAR SIR: I have yours of July 7, in which you say "I have been made aware that you have publicly announced before the class that my methods were "Quackish," and you ask, "am I correctly informed?" and you ask for explanation.

I do not know that I can give an explanation that will be satisfactory to you. I do not remember before the class, to have referred to you as "Quackish." In professional matters, I have occasionally referred to your various inventions and methods of work. I may possibly have made reference to your professional course, as not in accord with the general views of ethics. I certainly have no personal feeling toward you that would induce me to utter anything that was not true about you. I have said, I think, as much and more in your presence in dental society meetings about your objectional methods of advertising than I ever said in your absence.

You well know that I unqualifiedly condemn the extravagant methods of advertising your modes of practice, not only in you, but in every one who indulges in that kind of practice. I have wished a hundred times that you would abandon these unprofessional methods and place yourself upon a true professional basis.

You have devised many ingenious and useful things that ought to be largely serviceable to you and to the profession. To these I have occasionally referred in the class. I think you are honest in the views you entertain in regard to this matter, but that does not make right the practice.

Can you not see your way clear to a change in this matter, so as to avoid the criticism and severe censure of dentists in your own State and in others as well.

I may repeat, I do not remember to have referred to you before the class as a "Quack" or "Quackish" in your professional methods. If, however, I had or did so, it was in full accord with my convictions, but "Quackery" is not the worst thing in the world that a man can engage in.

You have ability that ought to command a far higher degree of respect and appreciation than is accorded you by the profession of your State, and I trust that in this respect, ere long a marked change may take place.

Yours very truly,

J. Taft.

Dr. Land says: "Dr. Taft will now have an opportunity to test his views in a legal sense, and I hope that he will be firm in his defence, if he has one. If, however, his defence will be that he did not say such things, or that he had no desire to nominate me as a "Quack," or that the language in his letter is not meant to infer unprofessional methods, etc., he will be given the full benefit of it.

"I am willing to admit that a dental society has a right to adopt certain rules and regulations and to enforce them so long as they keep within bounds of common law, common sense and common justice, but I cannot, in this republican country, submit to arbitrary measures. I claim that the so-called code of dental ethics is unjust, arbitrary and despotic, and the members of these self-constituted societies, should be held responsible in damages whenever arbitrary rules are resorted to to disgrace others unlawfully.

"In the present suit, I charge that my personal reputation has been seriously injured to such an extent that it has become impossible for me to associate with or meet my fellow-practitioners on an equal footing, as one who is honest, or to be properly recognized in my profession, and thereby the sale and introduction of my inventions, has been seriously injured, as well as my income from daily practice.

"Also, I charge the defendant as being guilty of taking advantage of his position as a professor in the University of Michigan and his official position in dental societies, to maliciously denonnce my methods as being "Quackish" before the public, injuring my prospects both as an inventor and practitioner in dentistry. The consequences of such acts may be better comprehended when we realize that the University of Michigan and its professors are known throughout the civilized world, and that his words were uttered before a class of students who will scatter in all directions, carrying the belief that my methods were dishonest. Under the circumstances I look upon the matter as not only a personal injury but as well one affecting the welfare of the general public, as it retards and prevents the development of improvements. Not only mine but those of others who believe in continued progress in the art of dentistry, in which I have spent a large part of my life and income, of which even Dr. Taft recognizes the value in his letter."

CHIP BASKET.

Catarrh Snuff.—Take of boracic acid, naphthalin, aa 4 dr.; camphor, extract violet, aa 2 gr.; essence rose, q. s. to perfume. Mix. Take a small pinch and snuff well up each nostril, then cleanse the passages by blowing well and thoroughly, after which use the snuff freely, drawing well back into the posterior nares. —*Ind. Pharm.*

Combination of Cement with Amalgam.—Mix the Amalgam in the usual manner, avoiding an excess of mercury, whereas the cement is mixed perhaps slightly thinner than usual; the two are then thoroughly incorporated by means of a stiff spatula. The amount of amalgam used is, in bulk, about one-third to one-half that of the cement. The material may also be prepared by simply dropping the amalgam already mixed into the liquid of the phosphate cement, and then incorporating enough powder to make a stiff paste. The filling is inserted in the same manner as a simple cement filling.—*Cosmos.*

Nasal Polypi.—Bell describes a new, painless and simple method of removing nasal polypi. His patient is instructed to blow strongly through the affected nostril, while he closes the other with his fingers. This brings the polypus down so that it can be seen He then injects into the tumor, with a hypodermic syringe, fifteen or twenty minims of a solution of tannin in water (twenty grains to a fluid dram). In a few days the tumor shrivels, dries up and comes away without trouble or pain to the patient, usually removing it with his fingers or by blowing his nose.—*N. Y. Medical Times.*

Dentistry and Dollars.—The dentist who values his time and advice is the man who is appreciated.

He who sells himself for nothing, generally gets all he is worth.

He who goes for half-price, when patients are able to pay a reasonable fee, goes for more than he would bring on the market.

A community never values a dentist higher than he values himself.

He who works for love may gain the reputation of a good Samaritan, but Good Samaritans are not all good dentists.

No greater mistake was ever made than to impress the community that dentists are poor business men. Straightforwardness, promptness, reliability and firmness are elements by which a man's qualifications are determined.—*Exchange.*

THE NORMAL MAN.—Prof. Huxley asserts that the proper weight of man is 154 pounds, made up as follows: Muscles and their appurtenances, 68 pounds; skeleton, 25 pounds; skin 10½ pounds; fat, 28 pounds; brain, 3 pounds; thoracic viscera, 3½ pounds; abdominal viscera, 11 pounds; blood which would drain from the body, 7 pounds. The heart of such a man should beat 75 times a minute, and he should breathe 15 times a minute. In 24 hours he should vitiate 1,750 cubic feet of pure air to the extent of 1 per cent. A man, therefore, of the weight mentioned, should have 800 cubic feet of well ventilated space. He would throw off, by the skin, 18 ounces of water, 300 grains of solid matter and 300 grains of carbonic acid every 24 hours, and his total loss, during that period, would be 6 pounds of water and a little more than 2 pounds of other matter.

MEDICINE IN VEGETABLES.—The following information may be useful to some, if not new to many: Spinach has a direct effect on the kidneys; a common dandelion used as greens is excellent for the same trouble; asparagus purges the blood; celery acts admirably on the nervous system, and is a cure for rheumatism and neuralgia; tomatoes act on the liver; beets and turnips are excellent appetizers; lettuce and cucumbers are cooling in their effects on the system; onions, garlic, leeks, olives and shallots, all of which are similar, possess medicinal virtue of a marked character, stimulating the circulatory system, and the consequent increase in the saliva and gastric juices, promoting digestion; red onions are an excellent diuretic, and the white ones are recommended to be eaten raw as a remedy for insomnia. A soup made of onions is regarded by the French as an excellent restorative in debility of the digestive organs.—*Herald of Health.*

HOW DOCTORS ADVERTISE.—Webster, in his dictionary, tells us that to advertise is to make known your business, and we do not see how any physician can let the people know that he is a doctor unless he advertises in some way. Some do it by putting a sign on their office, and giving out cards, and in this small way, let a few people know they are doctors. Others engage in more extensive advertising, by getting up a free dispensary for the cure of all or some special disease, and in this way seek notoriety by indirectly advertising themselves. Others organize hospitals, get up an influential board of managers, and in this way parade themselves and their practice before the public. Others organize medical colleges, and advertise an army of adjuncts and specialities. In this way they obtain free advertisement.

Others publish medical journals, the principal portion of which is devoted to advertisement, and in this way gain notoriety. Others organize city, county and State medical societies, to parade their views before the public, and thus advertise their business.

Others organize medical boards for examining other doctors, thus bringing themselves into notoriety and advertising their business. Others get up banquets at their own expense, and thus gain free advertising through the secular press.

Others perform necessary or unnecessary surgical operations, and by slipping a " V " into the hands of the reporter, advertise their business in a very extensive and cheap way.

Others join some popular club, church or society to advertise their business. Some will attend a popular church, and be called out during the services, so that the congregation note the fact and advertise their business.

Others will hire servants to rob their houses, that the reporters may advertise their business.

Others will purchase a fine livery and turnout. and by means of a gorgeous display advertise their business.

Others will write some buncombe essay for a medical journal, and obtain ten or fifteen thousand extra copies to advertise their business.

Others get up some compound, and get all the members of the medical colleges and prominent physicians to indorse it, and thus advertise their business.

While others come out with a straightforward advertisement in the newspapers, and pay for it.

Now these are a few of the many ways of advertising, and the lady and gentleman doctors can take their choice.—*Exchange.*

THE IMPLANTATION OF ARTIFICIAL TEETH.

Dr. A. H. Rainey, Centralia, Ill., was in the city recently, and we asked him how the teeth with metallic roots were doing. He replied that they were still giving satisfaction. The doctor read a paper on the subject last October at the Southern Illinois Dental

Society. At that time, he stated that the oldest case he had was inserted eighteen months previous, and was doing good service. He uses block tin, cast on a Logan crown. The metallic root is enlarged at a point one-third of an inch from the neck of the tooth, making it of such a shape as to be retained in the alveolus, mechanically; the root is polished before inserting.

The *Deutsche Monatsschrift fur Zahnheilkunde*, March, 1891, contains an interesting, but lengthy article on "The Implantation of Artificial Teeth," by Dr. N. N. Znamensky, They were tested by Professor Sklifosoffsky and A. B. Vogt, neither of whom could with two fingers shake or remove the tooth. In a third case, the dog gnawed at its chain before the tooth was firmlv fixed, and the ultimate result was not so good. Dr. Znamensky has only tried this in one instance on a human subject, and that was not a favorable case, as the anterior alveolar wall was absent, and the tooth had already been extracted some six weeks, and consequently the socket had to be drilled out. A month later the tooth was, however, fairly firm, but as the patient had to leave Moscow, he was not seen again. He was to write, if any unfavorable symptoms arose, but not having done so, Znamensky concludes, they have not occurred."—*Archives of Dentistry*.

DEATH FROM COCAINE INJECTION.

The *Journal fur Zahnheilkunde* reports a case of death in a dentist's chair from injection of cocaine into the gum, given for the purpose of inducing anæsthesia for the extraction of roots of teeth. The patient was a woman, 29 years old, apparently perfectly healthy, but very nervous. The extraction was painless, and nothing abnormal was noted. The operator withdrew from the patient's chair to get some water for the patient to rinse her mouth with, and on his return found her motionless. Physicians were summoned and artificial respiration was practiced, but without success. The autopsy disclosed the fact that three injections had been given, which served for the extraction of three roots. The quantity of cocaine in each injection was two centigrams, or one-third of a grain. The *Journal*, after commenting upon the dangers of cocaine, refers to nine cases of fatal poisoning reported by Dufournier in the *Archives generales de Medicine*. One of these cases, however, is doubtful, as the patient took a mixture of chloral and cocaine. The *Medical and Surgical Reporter*, in quoting the above, says that the uncertainty of the action of cocaine is shown in a case reported in the *British Medical Journal*, where one-seventh of a grain injected into the eyelid produced very serious poisoning.

ACIDITY OF THE STOMACH.

This condition is due to germs, and the cure lies in getting rid of the germs. Germs of fermentation in the stomach, produce first alcohol, then carbonic acid, and then acetic acid. A person troubled with this form of dyspepsia should be careful to take only such articles of food as do not favor the development of germs, and thus starve them out. Another thing to do is to wash the germs out of the stomach while drinking freely of hot water before meals. If food is put into a stomach already sour, of course fermentation will be set up immediately. Some persons notice that as soon as they eat, their stomachs become sour. The third important thing to do, is to stimulate the stomach to make more gastric juice, which is a natural antiseptic, and prevents fermentation and also, hastens absorption. The glands may be stimulated by applying hot fomentations to the stomach for half an hour immediately after the close of a meal, or, easier still, by wearing a rubber bag filled with hot water directly over the stomach for half an hour or an hour. Heat is a natural stimulant, and there are no possible ill-effects from its use in this way.—*Good Health.*

PLASTER CASTS.

Have the following articles on your bench ready for use :

1st. *Soap Varnish*, made by dissolving English white Castile soap in soft water to the consistency of milk.

2d. *Dredge Cup*—Take a half-pound baking powder can, and have your tinner make a cover for it, having the entire top part made of strainer wire, such as is used on milk pails. Keep this cup always filled with fine, strong plaster.

3d. *Bottle of Mixing Solution*—Consisting of soft water and two per cent. of alum or borax, or sulphate of potash.

4th. *Pepper Box*, filled with fine, powdered soapstone, and a jeweler's extra soft bench brush.

We will suppose you have a perfect impression for full mouth. Coat the impression with soap varnish, brushing it in thoroughly till a good lather forms; now rinse off with cold water and it is ready to pour. Next pour in your bowl the right quantity of mixing solution, then add the plaster, shaking it in carefully from the dredge cup till it comes a little above the surface of the solution; stir a little. If not thick enough, shake in more plaster, for to have a good, smooth, hard model it should be worked as thick as possible, and it can be worked very thick, as the solution used causes it to set slowly. Now fill the impression slowly, tapping the bottom of the cup to make the plaster settle and drive all air to the surface. When the model is hard enough, separate it from the impression and let it stand to dry. Shake the soapstone over it thickly and polish with the jeweler's brush till perfectly smooth. A model made thus, and then before packing covered with the tinfoil, or liquid tin, gives a plate as smooth as when vulcanized on solid metal cast.—*Dr. Wm. Steele, in Items.*

SPICE BOX.

A LAY SERMON.—The best thing to give to your enemy is forgiveness; to an opponent, tolerance; to a friend, your heart; to your child, a good example; to your father, deference; to your mother, conduct that will make her proud of you; to yourself, respect; to all men, charity.

EVERYBODY'S MAKING MISTAKES—yet the greatest mistake of all is stopping to worry over those mistakes.

IT is a melancholy fact, and much to be regretted, that good people who want only what is right often get what is left.

A QUESTION IN GRAMMAR.—Ethel—Say, Reggie, if a man druggist is called a pharmacist, what would you call a woman druggist?

Reggie (with disgust).—Any goose could tell you that—a pharmacister.—*Drake's Magazine.*

SURGERY.

THE EARLY DIAGNOSIS AND TREATMENT OF SYPHILIS.

BY FESSENDEN N. OTIS, M. D.

Aside from the accidents of local irritation, which must always be met by rest and sedative appliances, our only object should be to remove the abnormal obstructive living cell material, of which the disease we are combating practically consists. Living cell material can only be removed through fatty degeneration or metamorphosis, and its subsequent absorption be effected. The most active and reliable agent in effecting this is mercury in some form, in some way. Administered either externally or internally, we have a known means of accomplishing the removal of the infective cell material of syphilis, wherever situated. Clinically, this has been understood for a very long period, and the approved treatment by all accepted authorities to-day, for every or any stage or form or manifestation of syphilis, wherever situated is by mercurials chiefly—often solely. The internal administration of it is found to be more serviceable than its local use, even in the cure of the simplest as well as the most pronounced form of the initial lesion, as well as combating the disease in its progress beyond the local lesion, and on its way through the lymph channels and glands to the great lymphatic reservoir—the receptaculum chyli—through which the diseased cells find their way into the general circulation, and are thus carried to everv part of the economy.

All the approved local applications for cure of initial lesion of syphilis (after it has been freed from local irritation) are composed of some form of mercury. Dusting with dry calomel, application of the lotio nigra—which simply consists of a drachm of calomel to a pint of lime-water—or the lotio flava, which is made by adding half a drachm of the bicloride of mercury to a pint of lime-water. These, including the ung. hydrarg., with an equal part of simple ointment, or a five per cent. solution of the oleate of mercury, constitute the chief and only specific local measures by which we expect to hasten the cure of the initial lesions of syphilis.

The lotions are most appropriate to the cure of the open initial lesions, and the unguents to the indurations left after healing. But it is never sufficient to treat a well-determined initial lesion of syphilis locally alone. The internal administration of this drug, so benificent in its effects when judiciously used, is always indicated, excepting only in those rare and unfortunate cases where syphilis has occurred in a subject of highly scrofulous diathesis, and even then we are at loss to find a substitute which will justify its complete omission.

In all cases it should be used in the treatment of the initial lesion of syphilis with a clear understanding of the purpose for which it is to be administered. Not as an antidote to a hypothetical virus, the nature and composition of which we are ignorant; not as a specific even, but as a known agent in causing the fatty degeneration, absorption and elimination of the degraded cell material which constitutes the active agent in disturbing the organism of a person affected with syphilis; and it should be used from the moment of inoculation until the active stage of the disease has passed. This peccant cell material of syphilis is always hastily generated, and holds its life by a feebler tenure than the material composing the cells and tissues of which the normal human organism is composed; and hence such an amount of mercury should always be used as will affect the fatty metamorphosis of the syphilitic product without materially and unfavorably acting on the healthy cells and tissues.

Small doses of mercury, long continued, have been found clinically and empirically to cure syphilis, beginning with the initial lesion and continuing it during a period which experience has shown to be necessary to effect its entire elimination from the affected organism. The form which may be used is not material, so only that it is such that is best suited to the digestive peculiarities of a given case. Perhaps the one generally best borne is the pill composed of mass hydrarg. Of this, two grains, combined with exsiccated sulphate of iron, one grain administered once a day for a few days in cases of initial lesion, then two per day for a few days, then increasing to three, and if no digestive disturbance occur, such as indigestion or intestinal irritation—producing looseness of the bowels—such quantity may be continued until every vestige of the lesion has disappeared. This accomplished, the further administration of mercury or its equivalent will be required in some other form, either by mouth, by the skin through inunction, or by fumigations, until the contagious stage of the disease has passed.

The chief indication in carrying on this method of treatment is.

to administer the treatment in such a judicious way that none but the slightest evidences of mercurialism shall occur, and these only at long intervals. Such evidence appearing once in three or four months will give assurance that the treatment is efficient. Slight sensitiveness of the gums or the teeth, slight mercurial taste or fœtor of the breath may be looked for, and should be accepted as the extreme limit, just below which, as a rule, it should be the aim of the judicious physician to keep his patient. Gastric or intestinal irritation should be met by diminishing the dose in the first place. Then, if not enough to produce the desired effect can be taken without friction, some other form should be tried—perhaps the necessary equivalent in mercury with chalk. The pill of protiodide may also be used. If, still the irritation ensues, then the plan of treatment by inunction should be practiced. This may be effected by rubbing in from one to two drachms daily of a mild mercurial ointment (ung. hyd. et. ung. simp., parts æq.), on any part of the body, in places as free from hair as possible, and over a surface of half a square foot or more. If applied by an attendant (protecting his hand by a kid glove), the back is preferable. The part well warmed, the application should be continued for fifteen or twenty minutes, shifting place at each inunction in order to avoid irritation of the skin. A general warm soap bath may be given once a week, also when any sign of mercurialism occurs this should be given and the treatment temporarily suspended.

The inunction of a twenty per cent. solution of the oleate of mercury with an equal part of simple ointment, and perfumed by a few drops of the oil of bergamot, is equally efficient, perhaps a little more irritating, but, requiring less time, is well adapted to the use of patients who find it convenient to apply it for themselves.

In the administration of mercury, by this, or any other plan, the physician should be on the watch for any sign of mercurialism, and, if found, omit the treatment until it has passed off. A gargle of the chlorate of potass , rinsing the mouth with it morning and night, should be used, and the teeth kept scrupulously clean while the treatment is in progress. The early treatment of syphilis is just that, practically, which is called for during the entire course of the active or contagious stage of the disease, with the simple difference that in the former the local conditions require a consideration of changes which are the result of purely local influences.—*N. Y. Medical Monthly.*

ARTERIAL LIGATION AS A PROPHYLACTIC MEASURE.

Dr. L. S. Pilcher thus concludes an article on arterial ligation as a prophylactic measure after sudden, complete and permanent occlusion of the chief vein at the root of an extremity:

1. Serious circulatory and nutritive disturbances are to be apprehended.

(*a*.) In the upper extremity, when, in addition to the occlusion of the main vein at its root, simultaneous occlusion of any considerable number of the lesser and collateral branches has also taken place.

(*b*.) In the lower extremity, when the occlusion of the main vein at its root is sudden and complete, and has not been preceded by any conditions which might have occasioned a previous dilatation of collateral channels or the development of new ones.

2. The accidents of excessive œdema and of gangrene, when they occur, are due to the intense and active congestion of the limb through the arteries with blood for which there is no adequate outlet.

3. The development of collateral paths is not by the breaking down of valve barriers at the entrance of large collateral trunks, but by the dilatation of a multitude of minute branchlets. To effect this an increased arterial *vis a tergo* is not required.

Any increase in the normal blood pressure is attended with danger of overwhelming and fatally choking up the somewhat slowly enlarging collateral radicles.

4. The diminution of the amount of the arterial blood which enters a limb, whose chief venous outlets have become occluded, down to an amount not greatly in excess of that which can readily find an outlet from it through paths still remaining, is the first indication to be fulfilled in the treatment.

5. Whatever method is adopted to restrain the flooding of a limb with arterial blood, it must still permit the entrance of a sufficient supply for the nutrition of the limb. For this reason, in the lower limb, ligation of the common femoral is to be avoided, especially in the light of the disastrous results of such ligations already recorded.

6. Ligation of the axillary artery in the upper extremity, and of the superficial femoral in the lower, are safe expedients, and to be adopted as prophylactic measures, whenever occlusion of the

venous outlets of a limb is so great as to hazard the integrity of the limb, by reason of the circulatory stasis produced.—*N. Y. Medical Journal.*

SUBNITRATE OF BISMUTH AS A DRESSING.

1. Subnitrate of bismuth possesses antiseptic properties at least equal to iodoform.
2. No poisonous effects are to be apprehended.
3. It is unirritating, and diminishes secretion.
4. Its action is very prolonged, though not vigorous, so that the dressings do not require to be frequently changed.
5. There is no action at a distance, nor does any specific effect attach to it.
6. It is no disinfectant, but as an antiseptic keeps the wounds pure.
7. All wounds capable of healing by first intention can do so when dressed with bismuth.
8. It also presents an excellent material for forming scabs, under which epidermis can grow over the wound. Its use on granulating surfaces has not, as yet, been sufficiently studied.—*Annals of Surgery.*

LARYNGOLOGY.

RATIONAL TREATMENT OF NASAL CATARRH.

BY A. G. HOBBS, M. D.

[**Prof. of Diseases of the Eye, Ear and Throat, in Southern Medical College, Atlanta, Ga.**]

To treat successfully the diseases of the upper respiratory tract it is necessary that we have a full knowledge of the various means of examining the diseased parts, else our diagnosis will be guess work, and our treatment as liable, if not more so, to do harm as to do good. With some physicians there seems to be but one name, and, I might add, but one treatment for all diseases of the nose characterized by a discharge. It matters not whether the discharge be caused by a nasal polypus, a sarcomatous tumor, a fibroid, a foreign body, an ulceration, an hypertrophy over the turbinate, or an atrophy of the mucous membrane, it is called *catarrh*, and is treated in the same manner, by some so called specific, by means of an anterior or posterior nasal douche or by the introduction of some irritating powder. These so-called specifics are always irritating and often very painful, so much so, that their use cannot be, and fortunately is not, persevered in.

The practitioner who invariably resorts to this mode of procedure in a routine way, generally, knows as little about what is producing the discharge as his unfortunate patient. Is it any wonder, then, that catarrh is regarded as incurable when it is so universally treated without any discrimination? Almost any medical journal we pick up contains some catarrh remedy vaunted as a *sure cure*, without regard to the cause or character of the disease.

Since it is a fact that a large proportion of the communities in which we live suffer with some form of nasal catarrh, does it not seem strange that its pathology is not more generally studied, when the same amount of labor in this direction will give us better results than in almost any other toward an amelioration, and, in most cases, an entire cure of the disease? We have to treat the pathological conditions as we do in other diseases, when we reach success. There can be no specific for nasal discharge that may have so many causes.

If we would proceed rationally, then, in these diseases, the first thing we should do is to ascertain by a careful examination the cause of the discharge and the condition of the nasal membrane. If caused by a polypus, this must either be extracted with a snare or by the application of chromic, acetic or nitric acid, or by the thermo-cautery. If it be caused by a fibroid or sarcomatous tumor the same means must be pursued, but either will be more difficult to extract than a polypus. If by a foreign body, it must be extracted. If by an ulceration, it must be locally cauterized and constitutionally treated, or both, as the case may demand. If hypertrophic tissue is found on the turbinates, it must be snared away if large, or scarified if it partakes of the nature of cavernous tissue. All of this should be done with practically no pain by the thorough use of cocaine.

In the meantime, what should be done in these cases or in others where no tumors are found? Should the anterior nasal douche be used containing some irritating astringent? Never! Because it does not reach any part of the nasal fossa except the floor; and while it may wash out some of the accumulations contained there its secondary action of causing the tissues to swell will overbalance the only good it can perform—that of washing the floor of the nose.

Should the posterior nasal douche be used? *Never!* While it can do no more good (if effectually used, and not one person in ten can ever learn to effectually use one) than the anterior douche it may do a great deal more harm by throwing the fluid into the eustachian tube and causing middle ear inflammation.

Then what is to be done when the catarrh is found to be due to an inflammation of the mucous lining of the nose (the result in nearly all cases of a succession of colds) without a polypus or a tumor, or a foreign body, or an ulceration?

Sprays containing some emollient and non-irritating fluid, such as wormed vaseline, furnish the only rational means of reaching every part of the diseased membrane for the purpose of cleansing and medicating without irritating it. It is necessary that the material used in the spray should be perfectly harmless to the healthy tissues, exert a soothing influence to the diseased tissues, and have a tendency to lessen the inflammation.

These sprays should be applied both posteriorily and anteriorily. After the parts are thoroughly cleansed any astringent, resolvent, or alterative, such as pinus canadensis, eucalyptol, sandelwood oil, wintergreen oil, pure terebene or carbolic acid, as the case may demand, may be added to the vaseline spray in small quantities.

It should be remembered, however, that no spray treatment should ever irritate the parts to which it is applied; hence, the strength of the medicated spray should be gauged accordingly.

These treatments should be made daily by the physician himself for some weeks, then three times a week, and twice a week, according to the case. In this way alone do I believe that the great majority of nasal catarrhs can be cured.

As to the constitutional treatment, I do not believe any is necessary exept as indicated by the systemic condition. A torpidity of the bowels or kidneys should of course have laxatives or diuretics. A weakened condition of the system will also demand tonics and stimulants, but in most cases no internal medication will be found necessary.—*Progress.*

STATE DENTAL SOCIETIES.

Alabama Dental Association—Meets annually. Next meeting at Montgomery, on the second Tuesday of April, 1892. Pres., George Eubank, Birmingham; Sec., J. H. Allen, Birmingham.

Connecticut State Dental Society—Pres., E. A. Stebbins, Shelburne Falls; Rec. Sec., Geo. A. Maxfield, Holyoke. Annual meeting Oct. 27th and 28th, 1891, at Hartford.

Indiana State Dental Society—Meets next at Maxinkukee, on the last Tuesday of June, 1892. Pres., E. J. Church, LaPorte, Ind.; Sec., G. E. Hunt, Indianapolis.

Maryland State Dental Association—Meets annually in December. Pres., J. Emory Scott; Rec. Sec., W. W. Dunbracco.

Massachusetts Dental Society—Meets semi-annually in Boston. Pres., G, A. Gerry, Boston; Rec. Sec , E. O. Kinsman, Boston.

Minnesota State Society—Pres., W. C. Merrill, Albert Lee; Sec., L. D. Leoard, Minneapolis. Meets in Minneapolis, July 13th, 1892.

LOCAL SOCIETIES.

American Academy of Dental Science—Meets annually in Boston, Mass., on the first Wednesday in October. Pres., J, H. Batchelder; Rec. Sec., E. E. Hopkins; Cor. Sec , E. B. Hitchcock, Boston.

Brooklyn Dental Society and Second District Society United—Meets quarterly. Pres., T. H. Holly; Rec. Sec., A. N. Russell, Brooklyn.

Central Dental Association of Northern New Jersey—Meets bi-monthly; and annually in February. Pres., C. W. F. Holbrook, Newark; Sec., A. S. Hawley, Newark.

Central Illinois Dental Society—Meets annually. Pres., J. M. Fishburn, El Paso; Sec., W. A. Johnson, Peoria.

Chicago Dental Society—Meets monthly. Pres., D. M. Cattell; Sec., L. S. Davis; Cor. Sec., T. L. Gilmer.

Chicago Dental Club—Meets on the fourth Monday of each month. Pres., A. B. Freeman; Sec., C. Stoddard Smith.

Cleveland Dental Society—Meets the first Monday of each month. Pres., S. B. Dewey; Sec., Martha J. Robinson.

Connecticut Valley Dental Society—Meets 27 and 28 of Oct. 1891, at Savin Rock, Conn. Pres., C. T. Stockwell, Springfield, Mass.; Sec., A. M. Ross, Chicopee, Mass.

Detroit Dental Society—Meets monthly. Pres., E. C. Moore; Sec., Wm. Cleland.

Fifth, Sixth and Seventh District Dental Societies of the State of New York—Union meeting at Buffalo, October 27, 28 and 29, 1891.

Eighth District Dental Society, N. Y.—Annual meeting third Tuesday of April, 1891, Union Dental Convention, Oct. 28, 1891, in Rochester. Pres., C. S. Butler, Buffalo; Sec., W. A. Barrows, Buffalo.

East Tennessee Dental Association—Meets annually. Next meeting will be held at Chattanooga, Tenn., on the first Tuesday of Aug., 1891. Pres., R. A. B Noyers; Sec., S. N. Prothro.

Mississippi Valley Dental Society—Meets annually at Cincinnati, on first Wednesday in March, 1892. Pres. L. E. Custer, Dayton; Sec., H. T. Smith, Cincinnati.

Northern Ohio Dental Association—Meets annually. Next meeting at Oberlin, O, on the second Tuesday in May, 1891. Pres., F. S. Whitslar, Youngstown, O.; Rec. Sec., F. F. Doud; Cor. Sec., R. H. Barnes, Cleveland, O.

Northwestern Dental Association (embraces portions of Dakota, Minnesota and Manitoba) meets annually. Next meeting at Detroit, Dak., on the fourth Tuesday in July, 1891. Pres., J. W. Cloes, Jamestown, Dak. Sec., S. J. Hill, Fargo, Dak.

Odontological Society of Pennsylvania—Meets on the first Saturday evening of each month, at 8 o'clock p. m., at 13th and Arch sts.; Pres., Jas. Trueman. Rec. Sec., A. W. Deane.

Odontological Society of New York City—Meets the third Tuesday of each month. Pres., Wm. Jarvie; Rec Sec., E. T. Payne.

Odontological Society of Cincinnati—Meets monthly. Pres., C. M. Wright; Sec., W. M. Williams.

Odontological Society of Chicago—Meets monthly. Pres., J. Kester; Sec., E. Noyes.

Pennsylvania Association of Dental Surgeons—Meets second Tuesday of each month. Pres., H. E. Roberts; Cor. Sec., Theo. F. Chupein.

Pittsburg Dental Society—Meets the last Tuesday evening of each month. Pres., J. B Williams, Homestead; Sec., N. L. Reinecke.

Fifth District Dental Society of N. Y.—Meets semi-annually. Next meeting in Syracuse. October 24-26. Pres., R. F. Jones, Utica; Sec., T. B. Mason, Phœnix.

San Francisco Dental Society—Meets the second Monday evening of each month. Pres., W. A. Knowles; Sec., Chas. Morffew; Treas., J. J. Birge.

Sixth District Dental Society of N. Y.—Meets semi-annually. Pres., Wm. H. Hall, Binghamton; Sec., Myron D Jewell, Richfield Springs.

Seventh District Dental Society of Ohio—Meets annually, third Tuesday in May. Pres., O. N Heise, Cincinnati; Sec., J. R. Callahan, Cincinnati.

Southern Minnesota Dental Society—Next meeting in Mankato, third Tuesday in April, 1892. Pres., C. D. Snow, Mankato; Sec., W. D. James, Tracy.

St. Louis Dental Society—Meets first and third Tuesday in each month. Pres., John G. Harper; Cor. Sec., Emma E. Chase; Rec. Sec., DeCoursey Lindsley.

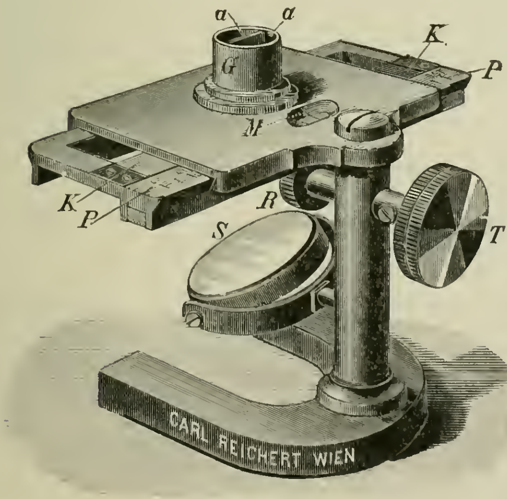
The Minneapolis Dental Society Monthly—Pres., E. F. Clark; Sec., E. J. Morrison.

Washington Dental Society—Meets second Tuesday of each month. Pres., R. Finley Hunt. Rec. Sec., H. M. Schooly.

First District Dental Society of the State of New York—Meets annually. Pres., A. I. Northrop; Sec., J. E. Dexter, New York.

Washington City Dental Society—Pres., M. B. Noble; Sec., Wm. Donally. Meets monthly.

The Western Illinois District Dental Association—Meets at Kewanee, October 16. Pres., F. Christianer, Abington; Sec., R. W. Bailey, Macomb.



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DENTAL AND SURGICAL

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CHLOROFORM, THE BEST OF ANÆSTHETICS.

BY JULIAN J. CHISOLM, M. D.

Surgeons in all parts of the world, have been much exercised of late over this most important subject, and a question of greater interest to suffering humanity, it would be difficult to frame. For the past forty years anæsthetics have been in use, and millions who have been operated upon under their benign influences attest the inestimable value of this greatest of modern discoveries. Ether, although the first introduced, had made but little headway when Simpson, in 1847, gave chloroform to the world. It met with immediate acceptance from professional men ; and within a very few years there was scarcely a surgeon of note in either hemisphere who had not used it, and extolled it in the strongest expressions of his mother tongue.

From its universal adoption, the inhalation of cholorform became the precursor of every serious operation ; those who enjoyed with it quiet sleep, and who without it would have experienced intense suffering, were soon numbered by hundreds of thousands. Ever-recurring wars, with thousands of wounded, gave surgeons an opportunity of using choloform on a very large scale, which only added to the well-deserved reputation which it seemed to have enjoyed from its very introduction.

There was but one single alloy in this general jubilee. Now and then some patient would die when chloroform had been inhaled. In former times such fatal accidents on the operating table, were common enough to every surgeon of large experience ; but now, since the introduction of chloroform, there was an uncomfortable suspicion that in some way the inhalation was to be blamed for these fatalities ; for under its life-saving influences nobody ought to die. With this impression once excited, each accident, as reported and copied from journal to journal, and from newspaper to newspaper, frightened the public, and slowly undermined the confidence which surgeons had previously had in this anæsthetic. A strong desire was expressed to discover some kindred agent which would establish general anæsthesia without danger.

For many years the ether anæsthetic had been abandoned, and was nearly forgotten, chloroform having superseded it and driven it out of use. It was now remembered that so far very few deaths had been attributed to ether, and hence this older anæsthetic began to take the place that chloroform had so completely occupied. At this present time ether is nearly as much used as chloroform, its votaries being irregularly distributed. With many chloroform holds its original undisputed sway ; while with others sulphuric ether is exclusively used. Now that ether is more extensively employed, deaths under its administration are more frequently reported, and hence the question which is forcing itself on the profession for solution, viz : which of these two anæsthetics is the safer, and by what safeguards can their administration be surrounded?

The many substances for anæsthetic purposes which have been brought to the notice of surgeons in the past few years have had but a very ephemeral existence ; and with the exception of nitrous oxide gas, which dentists find useful for their momentary operations in teeth extracting, and the bromide of ethyl, a powerful but evanescent anæsthetic, very valuable for operations of very short duration only, all have passed from general use. Chloroform and ether still remain as giants combatting for superiority.

That death occasionally occurs during the administration of both ether and chloroform, there can be no question. That deaths have occurred from the inhalation of either of these potent agents, even when the purest drugs had been obtained and the inhalation most carefully administered, must be equally admitted. That deaths are numerous when either of these fluids are carefully administered, no one well informed believes. That deaths are often wrongfully attributed to both of these anæsthetics, every one must acknowledge It is found very convenient to put the shortcomings of surgeons upon these agents. In common with the mal-administration of anæthetics—the dangers incident to the extreme protraction of operations, so exhausting to patients—clumsiness in the surgical manipulation, with consequent excessive loss of blood—temerity in undertaking operations, in which, from their magnitude, no reasonable success should have been expected—are disowned in the face of inhalation, to which death is often conveniently attributed, even when the patient dies, many hours or days after the operation, from causes which would have been properly named prior to the discovery of anæsthetics.

I have seen anæsthetics administered carefully and carelessly, boldly and timidly, by those well instructed in their use, and by others totally ignorant of their action. I have seen instances during the inhalation, in which the most serious accidents would have happened had not steps been promptly taken to prevent them. I propose in brief to analyze these cases, amounting to many thousands, which have come under my own personal observation, and from their careful consideration deduct rules for the guidance of the surgeon in the administration of anæsthetics, by following which, safety and success in the use of these most valuable agents can be secured.

For successful inhalation, much will depend upon the mode of offering the anæsthetic to the patient. The method I adopt for administering anæsthetics is simple, and is the one in general use. Should I have control of the patient for twenty-four hours before I operate, I always insist upon a fast for at least six hours prior to the inhalation. This rule, however, I am compelled to break daily. I use anæsthetics extensively in my office practice to aid in diagnosis in the ophthalmic diseases of irritable and fretful children, as well as in operations at the Eye Clinic, which being held at one o'clock in the day, immediately after the mid-day meal of the working classes, often compels me to administer the anæsthetic a very short time after a full meal has been taken. Beyond the vomiting, which is very annoying to the operator, and delays the speedy completion of the surgical procedure, I have seen no bad result from it. The precaution of loosening the clothing, especially that encircling the throat, chest and abdomen, so as to facilitate respiration, I never omit. I also make it a rule to inspect the mouth of adults and always remove false teeth. These may become displaced during the anæsthesia and make serious complications.

With adults a drink of whiskey, in my practice always precedes the inhalation. Young persons bear anæsthetics so uniformly well that no such precaution is needed with them. A hypodermic injection of morphia just before the inhalation facilitates the administration of the anæsthetic, and aids in sustaining the action of the heart. It also extends sleep when the narcotic action of the anæsthetic has passed off, and mitigates the after pains of the operation, a very desirable effect.

A towel many times folded and formed into a hollow cone *with open top* if chloroform is used, and *closed top* if ether is to be administered, makes the very best inhaler that I am acquainted with, and should be the one in universal use. It may not be so economical, as are many of the special inhalers, in the consumption of chloroform, but it does not become the receptacle of the throat excretions of successive patients, and is in this respect much more cleanly and desirable. A thick towel can always be obtained, can be had clean, and will permit the more or less ready passage of air (as folded for the special anæsthetic to be used), without which neither chloroform nor ether can be administered with safety. In my operating case I carry several long, stout pins, known as shawl pins, for the purpose of pinning together the ends of the towel, folded in cone form. These simple instruments I find equally valuable with any in the operating case. There are innumerable special apparatus for administering anæsthetics—some made of metal, others of hard rubber. All of them are more or less bad and unsatisfactory when compared with the home-made towel cone.

In using ether the cone, with closed apex, having its cavity well sprinkled with the fluid, is placed directly over the nose and mouth of the patient and held firmly upon the face, notwithstanding the struggles and cries for breath, until the patient becomes prostrate and insensible, or until more ether is needed. While the patient is struggling to escape from what he conceives to be an attempt to strangle him, be careful to keep only the free base of the folded towel pressed upon the face, leaving the mouth and nose free in the ample cavity of the cone, which pressure has not effaced or in any way interfered with as an air chamber. Should the cone be flattened against the patient's nose, very ugly symptoms of suffocation may be brought about, not by the ether, but by the towel.

With chloroform such a procedure, as the above described mode of administering ether, would properly be called a very dangerous mal-administration, and deserving of severe censure. Chloroform well diluted with air, must be *slowly* inhaled so as not to cause any suffocating feelings whatever. Into the cone, *with apex open*, is poured a small quantity of chloroform. The towel is then held at some distance from the nose, and is slowly approached as the effects of the drug are experienced, until the base of the cone reaches the face about the time when the patients is half anæsthetized. From time to time an additional amount of chloroform is sprinkled in the cone to replace that lost by evaporation. The upper end of the cone is always carefully kept open for the free admission of air. By commencing the inhalation with a very dilute chloroform vapor no discomfort of suffocation is experienced by the patient, and sleep soon begins to mark the approach of anæsthesia.

During the inhalation, I watch the face more than I do the pulse, although the face, the chest movements and the pulse, as felt in the temple, are all kept under constant observation. The color and expression of the face will always be a sure index of the working of the heart and lungs. As soon as sleep begins to show itself, I take away the pillow from the head of the patient, so as to insure a harizontal decubitus, which would often be seriously objected to by the patient during the sensible condition. Should symptoms of vomiting show themselves, the patient is immediately turned over on the side until emesis is accomplished. The anæsthetic is continued, notwithstanding the retching. I find the continued inhalation of the anæsthetic the best method for checking that involuntary contraction of the abdominal muscles, which accompanies vomiting.

I continue to administer the anæsthetic until I find the reflex action suspended, as expressed by absence of contraction in the lids when the eyeball is touched. Then, I consider the patient ready for operation, and in a safe condition to have it successfully performed. The patient lies in deep sleep, undisturbed by any peripheral irritation. The heart and lungs continue to work harmoniously, through their own nerve centres, uninterfered with by reflex agencies, transmitted as they would otherwise be from the peripheral nerves through the cerebro-spinal axis to these special nerve centres. While the patient escapes all pains, and the surgeon avoids all the inconvenience of movements, the patient lies in motionless sleep, undisturbed by the surgeon's knife, all the faculties essential to life being in full operations. This is the condition which I recognize as full and safe anæsthesia. Less than this would permit dangerous and even fatal reflex complications. More than this would be extreme narcotism, which, by suspending the influence of the nerve centres, would stop the working of the organs—the heart and lungs—which these centres, when undisturbed excite. Fortunately it would require much more of the anæsthetic to bring about this suspension of the vital function—a degree of narcotism which should justly be called an overdose. Between this excessive narcotism and the safe and thorough anæsthesia there is a broad gulf, which only the rash or ignorant are likely to bridge. When the patient is fully anæsthetized, the inhalation is stopped, to be renewed from time to time, if the operation be tedious, and signs of returning consciousness make themselves apparent.

Anæsthetics are among the most powerful drugs of the Pharmacopæia, and must always be administered with caution. "To bring a living being to that borderland in which life in many respects so simulates death, should at no time be a fool's occupation." It is a condition which the strongest-hearted patient cannot face without some uneasiness, and many submit to with great alarm. The administration of anæsthetics, should therefore be only entrusted to skilled hands, who, knowing what they have to do, will give all of their attention to the serious matter which should absorb them. Hence, it is better for a surgeon to have as an administrator of anæsthetics a physician who takes no interest in surgical operations, and who will not have his attention for even a moment diverted from the face of his patient.

From my own experience and observation, I can readily see how there can be, at least seven recognized causes for death during the administration of anæsthetics, even when pure drugs are used, the patient being in the recumbent posture, with loose clothing, and in a proper position for its inhalation.

The inhalation of a general anæsthetic in the sitting posture, is dangerous, and should never be undertaken.

May not the perfect safety with which chloroform, is used in obstetrical practice depend much upon the empty condition of the stomach, the loose clothing, and the horizontal decubitus, which are considered the best preparation for safe inhalation, accompanied as it always is in obstetrical cases, with no fear of, but a longing for, the anæsthetic to escape the pain of labor?

In the first place, I can understand how a cloth saturated with chloroform, and covering up the face of a patient so as to exclude air, may necessitate the inhalation of so saturated an atmosphere as to cause excessive irritation of and spasmodic closure of the air-passages. This will act injuriously upon the respiration and circulation. Should a fatal result occur under this crowding process, a faulty administration, we would not call this a death from chloroform under careful use, but its careless abuse. This result could not occur if common precautions are taken, such precautions as every physician, is expected to use who administers any of the efficient drugs of the materia medica. Should a physician, intending to administer hypodermically a few minims of Magendie's Solution from a full syringe, carelessly inject the entire contents under the skin, no one would attribute the blame to the morphia, but to the hand that worked the syringe. In this case, life is sacrificed by carelessness in the use of a remedy known to be potent, and therefore one to be used with caution.

A second cause of death may readily occur with the early administration of both ether and chloroform. In many cases the local action of the inhaled vapor so irritates the throat as to cause contraction in the tongue muscles and a closure of the laryngeal opening by the close approach of the carytenoid cartilages and the overlapping of the epiglottis. This condition is evinced by stertorous breathing, change of countenance, congestion of face, impeded thoracic movements, and vain attempts at thoracic expansion. The patient is threatened with asphyxia by an involuntary but successful effort at partially swallowing his tongue. Should he be allowed to remain in this condition, death will as surely take place as when one is seized by the throat and is fatally strangled. As soon as this noisy breathing commences, seize the chin of the patient and draw it forcibly upwards. The object of this manipulation is to efface the indentation of the neck by drawing the hyoid bone forward, and with it the root of the tongue. When a straight line is made of the neck, from the sternum to the chin, the whole front wall of the throat is pulled away from its posterior vertebral wall, giving the greatest amplitude to the laryngeal opening, and making a straight passage for the inspired air from the nose through the pharynx into the lungs. As ths chin is forcibly raised a sonorous inspiration is immediately heard, the noisy stertorous breathing at once stops, respiration becomes easy and the congestion disappears from the face. Pulling the root of the tongue forward by stretching forcibly the Sterno-hyoid and Genio-hyoid muscles is much more efficient in opening the laryngeal passage than the plan recommended by some surgeons of pulling out the tongue by forceps. At this stage of anæsthesia, before relaxation is brought about, it is not easy to open the mouth. The jaw muscles are firmly contracted, requiring force to separate the rows of teeth. The fingers cannot be gotten into the mouth, and if they could, the tongue is to slippery to be drawn out by them. A forceps of some kind must be used. A proper ring forceps for drawing out the tongue, an instrument that will hold by pressure and not by sticking into the organ, is seldom found in the operating case of surgeons. In the pressing emergency any forceps at hand is made available. Either a dressing forceps or perhaps the toothed forceps used for the ligating of arteries is thrust into the mouth, the tongue is seized, and as it resists the drawing out, its substance is torn by the teeth of the slipping forceps. For days after the operation a swollen, painful tongue annoys the patient. Pulling up the chin needs no apparatus. It is the most convenient, as it is the most efficient means of procuring immediate relief. It is only necessary to have the knowledge and apply it. Should the drawing forward of the tongue be omitted when this ominous congestion of the face occurs, we would have another glaring instance of death from the mal-administration of the anæsthetic. A surgeon who is not prepared to protect his patient from this accident, while inhaling an anæsthetic, would have as good reasons for escaping censure as he who, after an amputation, neglects to secure the arteries, and hence allows the patient to die from hæmorrhage.

A third cause of danger in the inhalation of anæsthetics resides in the inexperience of the administrator or in his inattention. I have already said that the physician who administers an anæsthetic has full occupation in the part assigned to him. He should not permit his attention to be diverted to the surgical work performed by another, and for which he is preparing the patient. I have seen instances in which the administrator of the anæsthetic, often a student of medicine, in his eagerness to follow the several steps of the operation on some distant part of the body, had become so oblivious to his responsible trust as to allow the thickly folded cloth to compress firmly both nose and mouth of the patient, who, with asphyxia imminent, was too insensible and powerless to push away the obstacle and escape the threatened suffocation. Had the patient a feather pillow pressed over the face he could not be more surely suffocated than by this thickly folded towel. Many a time, in doing general surgical work, have I pulled the chloroformed cloth from the face of the patient to the immediate relief of the respiration. Had the careless administrator been permitted to smother his patient, we would have had a death announced from chloroform, while a towel which had never known chloroform, if applied in a similar way would have done equally efficient work. Another clear case of careless administration. In opthalmic surgery, to which my work is now exclusively confined, this accident cannot occur, as the face is constantly under my own observation.

Still a *fourth cause* of death will be wrongly atributed to the anæsthetic should it occur during the act of vomiting. A watchful administrator of an anæsthetic, can always forsee the coming vomiting and prepare for it by turning the patient over, *before* the contents of the stomach escape. In the hands of careless operators I have seen the contents of the stomach come up with a gush, a perfect water spout of partly digested food, then falling back over the face, making a horrible mess, and threatening the breathing. If the patient be allowed to remain upon his back during emesis, and be not rolled over upon his side or face, during the sudden inspiration which immediately follows some of the contents of the stomach might pass downwards from the pharynx into the trachea and cause death by suffocation. Autopsies are not often thoroughly made after death attributed to an anæsthetic. Usually the brain, the heart and the kidneys are examined, and possibly the stomach, liver and bladder, and all found healthy, but the throat, and especially the larynx, have not been inspected, and therefore the cause of death, is not discovered. In a reported death during chloroform inhalation, in which a patient suddenly expired immediately after the act of vomiting, the larynx and trachea were found packed with food ejected from the stomach. The patient did not die from chloroform poisoning, but was suffocated by a piece of half-digested meat. In another case at the University College Hospital, London, of death following vomiting under ether during an operation for strangulated hernia, the autopsy exhibited stercoraceous matter in the trachea and right bronchus. Again, a case of death at the hands of a careless administrator, in his bad manipulation of the patient, and certainly not from the anæsthetic.

(To be continued in No. 4).

[P. S. As we cannot endorse the above statements in regard to Nitrious Oxide Gas being an anæsthetic, nor as to the use of the apparatus which the Doctor has advised, as well as several other recommendations, we shall take the liberty of reviewing the Doctor's paper in our next issue. But we shall continue the publishing of Dr. Chisholm's excellent paper for the many good things it contains.—EDITOR.]

ELECTRO-DENTAL SCIENCE.*

BY S. B. PALMER, M. D. S., SYRACUSE, N. Y.

The subject here presented, is a purely scientific one. An experience of thirty years convinces me that it is of value only to minds more or less scientifically educated to receive it. Animals do not live on mineral food; inorganic matter must become organic before it nourishes higher forms of life. All that is here presented will stand or fall by scientific investigation. For that purpose it is offered to your Society, because the members of the Eighth Dental District have opportunities for scientific investigation.

The early history of Dentistry, is evidence that science was second to prejudice. The first dental periodical in this or any other country, had a noble title: "The American Journal of Dental Science." Its first editor, Dr. E. Parmly, was a prominent member of the "American Society of Dental Surgeons," and the most persistent in assaults upon members for using amalgam. Society Lynch Law was instituted, and offending members expelled without trial by Science. When Dr. Parmly was interrogated as to his practical knowledge of the material, his reply was: "I have neither used nor experimented with it in any way; I would not touch the nasty stuff." The profession was then young, and hardly through the "witch burning" period.

To imagine a picture: We see a freight train of dental supplies drawn by the locomotive Progress, with Practice as engineer, and Dental Science seated in the caboose. Recently the train pulled into the Grand Central Station of the Sciences, and Dentistry was accorded equal rank with Medicine.

No one can study the Natural Sciences without being convinced of the solidarity of nature. As the familiar phrase expresses it, "The laws of Nature are the thoughts of God."

Amid all that is changing there is one thing that is unbiased, unprejudiced by likes or dislikes, doubts or fears, and that is the law of Nature, which is truth as it came from the Creator.

The object of this paper is to arrange in concise form a summary of convictions and conclusions, the result of thirty years' investigation in search of laws which preside over and determine operations for the preservation of teeth by filling. At last, to the writer it seems that the labor has been rewarded, and all that remains necessary to add a new chapter to dental chemistry is the seal of scientific recognition.

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*Read before the Eighth District Dental Society of the State of New York.

We start with the hypothesis as taught by chemistry that there are nearly seventy simple elements of matter; that the smallest particles are called atoms, which cannot be decomposed; that they combine and form innumerable compounds, the smallest division of which must contain two or more atoms, and we call this particle a molecule. Again, every atom or molecule of matter is acted upon by two very subtle, mobile, imponderable fluids or forces, permeating all ponderable matter, and capable either of setting the atoms of the latter in motion or of moving themselves in accordance with laws which it is the object of this communication to explain. These two forces, which are never independent of one another, but always co-existent and simultaneously developed in every case of electrical excitation, are usually determined positive and negative, to distinguish between them. They are manifest in several ways, as in static electricity, electricity from chemical action, in the polarity in connection with magnetism, in chemical action, fusion by heat, etc., etc. They are allied with acids and alkalies, the former positive and the latter negative.

The saying, "Electricity is Life," comes the nearest to that unknown energy of anything we can conceive of; we may call it the spirit of matter. We read of the creation of man—"Male and female created He them," which is the God-given power to multiply. Had we a like history of the creation of energy, it might read: When God created the elements of which all things are made, He breathed upon them positive and negative electrified energy, and they became living matter. It is of this energy I wish to speak, and to speak so plainly and literally that all may comprehend, though they have never studied electrical science. It appears that effects are the results from contending forces; equalization is the outcome. Dental caries is an evidence of contending forces as are acids acting upon alkalies, etc.

We boldly start with the knowledge that with Nature there is no caprice; there is law for every form and change of matter. It is embodied in the canon "that under the same circumstances the same effects always result from the same causes;" that is, so far as human observation can determine. The laws mentioned are distinctly defined through all changes of matter, whether inorganic or organic. We take our first lesson from mineral or inorganic compounds, as being most simple. We understand that solid substances are held together by a principle called cohesion. One of the essentials of cohesion, is mobility of atoms or molecules. Fluids afford the general means for this action. Crystals, precious stones, vegetable and animal formations, are produced through the fluid menstrua. Moisture and semi-solids admit of cohesive combinations in proportion to their freedom of molecular movement. Fusion by heat under flux, is the general method employed for metals. Glass is also a product from cohesion by fusion.

In all of these methods the peculiar principle of affinity plays an important part. It is an attraction of atoms or molecules caused by the energy belonging to matter, as already stated. To illustrate: metals under heat, while protected from oxygen by flux, unite to form a solid mass. We have a right to suppose that by the intense heat the atoms become electrified, are attracted and united by affinity and cohesion. As evidence of electrical attraction, we may notice the electro-plating bath. The fluid holds the atoms in solution, but owing to the distances of separation, without electrical excitation there is no concentration or disposition of the metal, By the passage of an electrical current each atom receives a higher electrical potential, and is attracted to the negative pole, where the band of cohesion binds them into a metallic mass.

By this process aluminum is extracted from clay, and by combination of potential and affinity mercury picks out gold from sand in placer mining, and lead, as flux, retains silver in the smelting furnace.

As we leave the mineral and come to the borders of the organic kingdom, the gateway is locked to all who have not the combination, which is Potentiality. How few understand its accepted sense. To me, no other word conveys so broad a meaning, or reveals so much of the mysteries of nature as this one short word. Not only in our field of labor, but everywhere, in all forms and conditions of matter, in every science connected with matter, potential is the energy at work. Potential in popular language, is understood as power, or one who possesses great power—a prince, sovereign, emperor, king, monarch.

Potential has recently been adopted by electricians to express an idea quite distinct from the meaning of any other term relating to electricity. As this comprises all that is necessary to be known of the laws pertaining to dental operations, a comprehensive definition will bring the matter intelligently before the profession.

To make a commercial application of potential: we understand that a person worth a million dollars, has far more purchasing power than a poor man; we would say that a million dollars is of a higher potential power than zero, or poverty. Imagine this large fortune squandered; the potentials are equal; no commercial current; no credit. The world's progress is the result of effort to obtain a higher financial potential. Let us make a mechanical application: A reservoir for water, is constructed at high elevation. Let us say that the water in the reservoir is of higher potential than the lake below, which may be taken as zero. By the intervention of a pipe line, wheels or engines, the difference of potential between the reservoir and the lake could be used for mechanical purposes; when the potentials become equal, the power ceases. If, however, by rains and springs the potential is maintained, the power continues. With this we are prepared to get a definition of Electrical Potential. This principle has formerly been expressed by "electromotive force;" but this does not fully meet all the requirements. The following is a definition from "Electricity and Magnetism," by Jenkins. "Difference of potentials is a difference of electrical conditions in virtue of which work is done by positive electricity in moving from the point at a higher potential to that of a lower potential, and it is measured by the amount of work done by the unit quantity of positive electricity when thus transfered." The above is a comprehensive, scientific definition, but it is above the understanding of the popular reader. As sea level is taken as zero in measures of altitudes, so is the earth regarded as *nil*, at the point where the potential of bodies is taken, above or below the potential of the earth. Let us consider two conditions of electric current, high and low, usually termed positive and negative. Electrical energy is derived by reason of the difference of potentials of current in their passage from the higher to the lower. The earth is always ready to receive positive currents, and as ready to give negative electricity in exchange. That is, when bodies of usually high potential, are reduced below the potential of the earth, shocks and currents are thrown out from the earth to meet this condition, and still maintain the principle that currents flow from a higher to a lower potential. Some writers make the distinction by calling it a high-low potential. Observations of my own, some of which are not found in books, afford popular illustrations of these currents.

Those who have been in the country on a bright, sunny day in September, may have noticed thistle-down floating upward as far as it could be seen. These were not borne upward by currents of air. Those who have seen pith balls vibrate between conductors of electric machines, or have seen the hair when charged with electricity stand up and try to escape from the head, may understand that thistle-down, a much lighter substance, when so charged would rise into the upper air. This, too, accounts for the floating of spider webs in mid-air. The cause of this seeming disregard for gravitation is in obedience to this law, that bodies charged with like electricity repel, as the same pole of a magnet repels the needle and attracts the opposite pole. The surface of the earth and all bodies subject to electric excitation are charged with negative electricity. The clouds, and the region above the under side of the clouds, are positively charged, while the central portion of the air space is neutral—practically an insulator between the two potentials. Electricity passing through this space must be conveyed by some matter charged, repelled or attracted, or be forced through by high potential, as in the case of thunderbolts. Nature employs this energy in elevating the immense quantity of water which is evaporated upon the globe to form the clouds, and the same force condenses the vapor and returns it to the ground in rain and snow. Electricity is conveyed each way by this process.

When either the clouds above or portions of the earth surface below, are at a high potential, an exchange or equalization takes place, as in thunderbolts from the clouds or the aurora from the earth. Another illustration of potential, is found in the dynamo at the central station of electric power. The dynamo, which is driven by steam or water power, maintains the positive pole at a high potential above the earth, or the negative pole corresponding to the ground. The current thus obtained in its passage from the higher when made to pass through motors, runs trains of cars, or when forced through air space from one carbon candle to another, lights the city.

To come down to currents of less intensity, we see the same laws in the working of the galvanic cell. By reason of chemical action upon zinc the negative element is held at a higher potential.

Work is done on the line in conveying signals by telegraph, or the voice by telephone. Still lower, when chemicals are thrown together in fluids, where there is any change, electricity is evolved, though the conditions are wanting to render the currents perceptible. A portion of the energy is spent in charging atoms and molecules with positive and negative electricity, and thus by attraction and repulsion they find their affinity. In case the compound is to be a solid, they are locked closely by cohesion.

We now carry this definition, with the continuity of the law of potential, up into organic life. Life depends upon life. It cannot develop out of anything that is not life. It is important to know the difference between a stone and a plant, though both may be composed of the same atoms. Both are subject to physical laws, the plant possessing all the stone has, and more—a mysterious something called life. This life did not lay in the stone, except in an undeveloped form. There is no trace of organic life in a stone, while the plant is permeated with a principle above the physical properties of plant or stone. As we rise from vegetable to animal life, we find still a higher state which we cannot explain.

Let us start with a seed: We are told that it contains a germ. Around the germ is stored food, or starch sufficient to sustain life until the shell or pod bursts, leaves unfold and rootlets enter the soil, and there is a young plant or tree.

The scientific question is, how is the food prepared from the soil. Vegetables do not live on mineral food. Dr. G. V. Black, in an article entitled "Agency of Micro-Organisms in Dental Caries," (American System of Dentistry, Vol. 1, page 756,) lays a foundation upon which to build a new theory of the energy of organic life. After giving the process of seed sprouting, as hinted above, we have the following:

"If the grains of corn are planted in a soil, the constituents of which have been chemically examined, it will be found that during the process of germination this soil has received acetic acid. This is in accordance with the laws of life, as we find them everywhere expressed, wherever they have been sufficiently examined, for in conjunction with all growth, we find the formation of waste products. In this case the waste products are acetic acid, which is left in the soil, and carbon dioxide, that is given off to the air. * * * Suppose we have planted the seed in two inches of damp sand placed upon a piece of polished marble. Growth takes place and the roots strike down through the loose sand, and soon come in contact with the solid stone. They are unable to penetrate this, and instead they spread out upon its surface. After this growth has continued for a time, if the plant and sand be carefully removed from the polished stone, it will be found that wherever a rootlet has come in contact with it, it has left its trace in the form of a removal of the polish, and a close examination of this shows that a portion of the solid rock has been dissolved and removed, leaving the imprint of every rootlet. The roots have been doing the same towards the stone that the perigerm did towards the store of starch. They have been preparing the food for the nutrition of the growing plant, and the hardness, the apparent insolubility of the stone, has not been a sufficient barrier against them. * * * This is an illustration of the universal law that all living things, both plant and animal, must digest and prepare food material for assimilation. In the physiological sense it is not essentially different from the digestion which takes place in all the higher animals, including man."

The article then describes the difference between the digestive apparatus of animals and plants, and as a whole comes the nearest of anything I have found to announcing the source of energy which enables the growing plant to dissolve stone or minerals, and prepare the food suited to its demands. It has not been the province of science to teach what that something we call life, is. Through science we see the continuity of law, or laws, which we study in the mineral kingdom, and follow them up through vegetable and animal life. Electricity is a something as mysterious as life. It is as far from our vision and comprehension as life. We need no proofs that it exists and is connected with matter everywhere. We have studied the laws which govern its action upon matter, and find it a power in certain conditions, but powerless under other circumstances. We come to know that these conditions are determined by potential, as already defined and explained. We know as well that electric currents decompose binary compounds, and that acids and alkalies are a product of electrolysis; we know that electric currents, through the agency of fluids, render atoms and molecules of matter attractive or repulsive to each other; that in all cases of electrical activity there are two co-existent currents, two poles, two potentials, and that work is done by the passage of the currents from the higher potential to the lower.

We now have in dentistry men of science, and their earnest, persistent labors have placed before us facts which scientifically settle many hitherto vexed questions. Professor Miller's conclusions have gained for him the admiration of all dental students. The following quotation from him, (American System of Dentistry, Vol. 1, page 812), will introduce a condition of the teeth, or rather a changing condition, for which no natural laws are given:

"A most powerful influence, which we do not well understand, is exerted by nutritive processes in the teeth themselves. I am assured by men who have grown old in the practice of dentistry, that mouths which have long been under their observation, and which practically have been completely free from caries for years, at once, on account of some sudden change of health, show a general breaking down or crumbling of the teeth *en masse* in the space of a few weeks. It has also been my experience that patients who have been dismissed by their dentists in America with the assurance that according to previous experience, their dentures would require no treatment for one or two years, have come to me a few weeks later with teeth looking as though they had not been under the hands of a dentist for years. Some say the ocean voyage spoiled their teeth; others attribute it to the change in the climate, food, health, etc."

In the above we see a groping after something not defined. To the writer, that is no more a mystery than the molecular movements in the electro-plating bath. One law presides over both, only that relating to organic bodies is more complex.

Before entering upon this higher plane I wish to prove that the decay of teeth, decomposition of zinc phosphates and decomposition of particles of food at the cervical border of the gums, are greatly accelerated by potential, and the process is in accordance with a well known natural law. We see a correspondence in scores of instances, but will mention only a few. A post set in the ground decays at the surface of the ground. A log lying on the ground decays upon the lower side. We are told that this is because of dampness. Dampness is one of the conditions necessary, but this fact is known from observation, while it fails to furnish scientific reasons. The post and the log, by reason of the capillary attraction, draw up moisture perhaps a few inches, or it may be one or two feet. The moisture above the ground is of a higher potential than the ground, or the wood below the surface. Decay occurs where the work is done, and that is where the positive current meets the negative. If we examine a tree we find it a conductor the whole length, and the foliage so constructed by nature that it takes in the positive current and conducts it to the roots, where the work is done by electrolysis—plant digestion—in dissolving and decomposing the minerals, thus affording plant food. Here comes in the natural conditions above quoted, that growing plants attacked marble, and sprouting seed gave acid to the soil. Plants must have alkali. Electrolysis furnishes the acid to set the alkali free. A rapidly growing vine by the side of a high wall, becomes hungry for more alkali than the soil affords. Instinctively the little rootlets find a supply in the mortar, with consequent loss of the lime; the sand crumbles, the mortar is destroyed. The smallest seed or plant, even the micro-organism, comes under the same law, and alike produces the acid.

As we leave the earth's potential and follow the correspondence or continuity of law, we see it in all combinations of elements on a small scale. There is a difference of potential in a battery, not only between the two elements, but between the air and the surface of the fluid, as the zinc shows more waste between high and low water marks. Long used vulcanizers show the workings of the same principle at the average water line.

The same law is demonstrated by the tin vessel with a copper bottom. The iron is corroded a little above the junction of the copper and tin. To illustrate in the mouth, the margin of the gums is the line where work is done. That is, the gums and sound teeth, when wet with saliva, are negative as compared with fluids and the debris of the mouth. If pack-thread were cut in lengths and placed between the teeth, extending from the crown to the gums, the outer end of the thread would be at a higher potential than the lower. Acid would be the product, without waiting for fermentation or the lodgment of food. Decomposition of saliva would be sufficient.

Of course this condition would be followed by all that has been described, because it would be a soil for micro-organisms and a means of decay. One theory is, that if there be no lodgment of food there will be no fermentation and no decay. The other, that with no difference in potentials there will be no current, no decomposition and no decay. Both are scientific conclusions, but the lines have been run with different instruments; the one by the microscope, the other by the galvanometer needle. Each instrument reveals to us small causes.

Some idea of the minuteness of potential matter may be obtaind when we come to know that molecules, even atoms, have their potentials, and their potentials may be changed by change of electric current. Magnetize a fine needle. It has its poles. Break it in pieces, no matter how small, or put it in a mortar and grind it ever so fine, and each piece will still be a magnet with its poles. If iron filings be brought within a magnetic field, each filing becomes a temporary magnet. Take two pieces of thin, bibulous paper, wet one with saliva and the other with water and place them together, and they are at different potentials. This will help to explain why ligatures left around teeth mark their width in the enamel. We are now content with the idea that it is because of fermentation and micro-organisms. True, but not the whole truth. The entire surface of the ligature is exposed to the breath, and is of a higher potential than that next the enamel. As the root destroys the polish upon the marble, so does the product of electrolysis destroy the polish on the enamel.

If a post should be wound with a bandage of cloth and the winding be kept wet, the wood beneath would decay. Should the cloth, before winding, be sprinkled over with precipitated copper, the post would not decay. Not because the copper prevented the growth of organisms, but because the oxide of the metal penetrated the surface of the wood, and thus there was no difference of potential between the two surfaces. The action, if any, would be upon the outer surface of the cloth. This is precisely what amalgam does for porous dentine, and what gold does not do. If we ever hope to render gold efficient in frail teeth it must be done by insulation varnish.

Trusting that I have made it plain that the cervical border is a line of electrical activity as well as fermentation, we will follow this law up into the animal kingdom, and see no greater complications than are experienced in going from mineral to vegetable life. Our object now is to present a natural law which will reasonably and scientifically account for the conditions mentioned in the above quotation, viz.: the sudden breaking down of previously healthy teeth, in addition to the degeneracy of teeth during gestation, the absorption of the roots of deciduous teeth, and not less, to advance conclusions from the same law why teeth may be worn to the gums by abrasion without pulp exposure, while removal of dentine by acids or caries would expose the pulp without effort for self protection. Years of patient study have been spent in experimenting to obtain the scientific facts regarding dental caries. Years more would be required to answer the above questions by the same process. Not only has this study and training given us facts so highly valued, but they have prepared the mind to receive laws which connect one specialty with another, by which conclusions may be reached short of the tedious experimentations hitherto employed.

Let us take a lesson from an egg. Like a seed, it contains a living germ, with food material stored away to grow and sustain life until the germ has grown into a chicken sufficiently matured to burst its shell. In the sprouting of seeds, it may be seen that there is an excess of starch food laid in store, so that the roots partake of the nourishment from the soil, in preference to that left in the kernel. Quite the reverse of this takes place in the egg. The whole stock of material becomes exhausted, and more lime is needed to supply the demand to grow bones and feathers. Here the principle noticed in vegetation comes in, not only to supply the demand for the new life, but to set that life free from its shell of bondage. The roots of the vine extracted lime from the mortar. In like manner lime is taken from the shell, which becomes thin and weak, and the little chick goes forth to pick and scratch for its living. Up to this time the external surface of the embryo chicken and the inner surface of the shell were of the same potentials. At the proper time, and most probably on account of the alkaline element having been exhausted, there was a difference of potentials as a result, and the positive acid would extract food elements from the shell, and thus render it frail.

We see the application in the absorption of the roots of deciduous teeth. The teeth are a portion of the body, built up and nourished from it by the pulp and periosteal membrane, the crown, or enameled portion, corresponding to the shell of the egg. Without speculating upon a point which I have not made a study, I will say that the crown of the permanent teeth, probably by pressure, cuts off the supply, or its equivalent changes the potential of the membrane. In other words, it reverses the current and absorption is the result. Bear in mind, this is what should occur under the law.

This introduces the subject of mechanical abrasion. In this slow process Nature is not disturbed in the work within the teeth. The potential of the fluids in the tubuli is not changed, but warning of approaching danger stimulates the organs to greater activity, secondary dentine is deposited and protects the pulp as it recedes. If the removal of dentine should come from acid action, or from caries, which amounts to the same, the vital potential is reversed. Nature does her work from within. She will not work against her own potentials, any more than you can electroplate articles attached to the positive pole of the battery. Cases are recorded where decay at the cervical margin of the gums has been arrested and secondary dentine deposited to protect the pulp, as in the case of mechanical abrasion. I have found cases where cavities of decay have been filled with calculus. Both conditions are answered by the same law.

We are now brought to two extreme abnormal conditions of the system: one of high acid, and the other high alkali, or as compared with the earth's current, a "high-low" potential. Both conditions are constitutional, and both require constitutional treatment. In these conditions, as in the cases of climate, food or ocean voyage, the positive elements are too high above the negative. The saliva is thin and decidely of an acid nature. To meet this lack of lime, Nature extracts the most soluble portions from the teeth, and they break down. In the other extreme the secretions are thick ; tartar deposits are found upon the teeth, and occasionally in the urinal passages. Pyorrœa, where these tartar deposits are found upon the roots of teeth beneath the gums, belongs to this high alkaline condition, and indicates an acid rather than an alkaline treatment, We are able to follow up the continuity of this law, from its effects upon the aggregation of matter too fine to be discovered by the microscope, up and through all compounds, through the vegetable and animal bodies, until we lose sight of its influences on the mind of man, as exemplified in the power of mind over body or bodies. The thought of a lemon causes extra flow of saliva. Intense mental activity attracts blood to the head. The leader of a mob in a high state of mental potential incites other minds to murder and crime. The potential eloquence of a preacher leads sinners to repentance.

As a matter of history, at the opening ceremonies of one of the

Atlantic cables a message from America to the Queen was sent out from a battery composed of a gun cap, and the return message from the Queen's ring filled with sea water; the point is that by the consumption of a grain or two of zinc, the potential of the tons of copper in the cable was changed for each signal or letter composing the message. Is it any harder to believe that a passenger, making the same journey in six or ten days, breathing sea air, should become physiologically changed, or that climate, food, health or mental conditions, should bringabout the same results?

It is impossible in one paper to go into the details of the many phases connected with this subject. Much labor and thought must be bestowed before it will be fully understood. Every step higher is attended with greater complexity, as illustrated by animal and vegetable life. Trees receive their higher potential from air and light. The energy is conducted through the sap to the roots where work is done in converting minerals into plant food. In correspondence with this, animals breathe the air into the lungs, where it acts upon the blood. Food of various potentials is taken into the stomach, which corresponds to a galvanic battery, and in the process of digestion and the passage onward potentials become equal, and it is cast off or out of the body. The energy received from this chemical process is taken into the body, which acts as a storage battery, and may be expended in work through the muscles or brain.

MEMBERSHIP IN THE AMERICAN MEDICAL ASSOCIATION.—This is obtainable, at any time, by a member of any State or local Medical Society which is entitled to send delegates to the Association. All that is necessary is for the applicant to write to the Treasurer of the Association, Dr. Richard J. Dunglison, Lock Box 1274, Philadelphia, Pa., sending him a certificate or statement that he is in good standing in his own society, signed by the President and Secretary of said society, with five dollars for annual dues. Attendance as a delegate at an annual meeting of the Association is not necessary in order to obtain membership. On receipt of the above amount the weekly journal of the Association will be forwarded regularly.—*Dental Advertiser.*

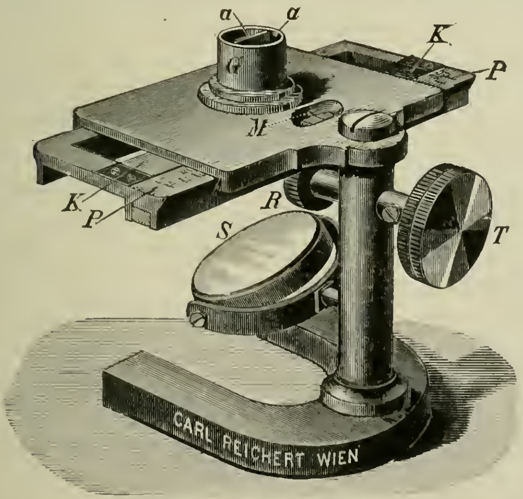
HAPPY THOUGHT.—On day, in 1830, when a working jeweller, Joseph Gillott, now the famous steel pen maker, accidentally split one of his fine steel tools, and being suddenly required to sign a receipt, not finding his quill pen at hand, he used the split tool as a ready substitute. The happy accident led to the idea of making pens of steel.

THE UNAVOIDABLE APPLICATION OF THE HÆMOMETER IN THE DIFFERENTIATION OF SURGICAL AND GYNÆCOLOGICAL COMPLICATIONS.

BY DR. FREDERICK GAERTNER, A. M., M. D., PITTSBURGH, PA.

This apparatus was designed to ascertain the amount of hæmoglobin in either a diseased or normal condition of the blood. It was devised by Prof. E. von Fleischl, and patented by Carl Reichert, of Vienna, Austria, see figure ——. This little instrument, the hæmometer, is the result of a need felt by physicians and scientists of having an instrument which will give a quantitative judgment (analysis) of the value and function of the hæmoglobin in the circulating blood. It was further necessitated by the inapplicability of the methods thus far prescribed for this purpose to the cases encountered by physicians; and, finally, it arose from the hope of advancing our physiological and clinical knowledge by rating the per cent. of hæmoglobin in normal or diseased human blood.

The hæmometer cannot be used either by daylight or electric light, and only by the light of oil lamps, candles and gas.



One-Half actual size. (Fig. 1.)

Every examination of blood by means of the hæmometer must consist of these three operations: 1st To obtain and measure the blood. 2d. To dissolve it in water, and to fill the instrument with this solution. 3d. To arrange the instrument and read the results.

This apparatus consists of a small and simple constructed horseshoe base, composed of a foot, column, mirror and table. Beneath the table is a frame which bears the glass wedge K, the latter being propelled by the milled-head screw R. Upon the table is a cylindrical vessel G, the one-half of which (*a*) is filled with blood which has been diluted with water, so as to be examined. The other half (a') is filled with pure spring water, after a tube, whose capacity has been exactly gauged, has itself been filled with blood by capillary action. It is brought into the half of the vessel at A, where the blood contained in the tube dissolves in the water until it becomes a perfectly transparent liquid. By the optical conditions of the apparatus it becomes possible under an illumination of oil lamps, candles or gas light to find a position of the glass wedge K, at which the color and brightness of every such blood solution is exactly the same. This point is sought by moving the wedge backwards and forwards by means of the micrometic screw T, and by giving the reflector a definite position, S.

Upon the frame which surrounds the wedge, a scale P is engraved, a part of which is visible through the aperture at M. This gives exact results in percentage of the amount of hæmoglobin in a certain blood solution. There is also a stationary index line on the side of the aperture M, which points also to the discovered amount on the scale. This hæmometer presents the following three advantages:

1. Easy and convenient management of the apparatus.

2. Rapid and direct results in percentage regarding the degree of normal hæmoglobin.

3. The small quantity of blood, only a drop, required for the examination.

For further information concerning the rules and application of Reichert's hæmometer consult my (Gaertner's) rules, published by the *American Monthly Microscopical Journal* of April, 1890.

The practical application of Reichert's hæmometer in the examination and differentiation of diseases of the blood in a surgical point of view, and especially in determining accurately and positively the quantity and quality of hæmoglobin in the circulation, supplies a long felt want. All physiologists, scientists, and especially expert microscopists will tell you that Hæmoglobin is not only a very peculiary preparation, but a highly necessary substance of paramount importance. Chemically it consists of C_{600}, H_{960}, N_{154}, FeS_{5} ,O_{179}, a crystalliable body composed of hæmatine and a colorless protied closely related to globulin, found in the red blood corpuscles, and constituting their coloring matter. The most important functions of hæmoglobin is that it conveys oxygen into the interior organism in the form of

Oxy-hæmoglobin, also it has a tendency of taking up and conveying iron salts.

Every practical surgeon admits the difficulty he encounters in forming a diagnosis and prognosis of the different diseases in the blood, i. e., not only implicating the cellular elements of the blood, (the white and red blood corpuscles) but especially the pathological-anatomical changes (condition) of the different organs, for example, the various different diseases of the Uterus, Spleen, Kidney, Liver, Lungs, Bowels, Bones, Nerves and Muscles. Whence such organs are diseased, the result of which the blood is the first tissue that suffers and becomes physiologically deranged into a pathological dyscrasie, not only is the chemical constituents (composition changed, the cellular elements increased or diminished, enlarged or shrunken, hypertrophied or atrophied, but the hæmoglobin, the red coloring matter of the blood (of the red blood corpuscles) is either on the one hand physically, chemically, microscopically or physiologically changed, or on the other hand increased or diminished, then by the examination and analysis of the hæmoglobin alone decides whether or not a surgeon or gynæcologist is as yet justified in venturing the surgical or gynæcological procedure, especially when there is already a pre-existing contamination or infiltration of the blood with a foreign substance, a neoplastic element, a micro-organism, or a metastatic embolism, conditions we commonly denominate a cancerous cachexia, a strumous diathesia, or a lymphatic dyscrasie. The hæmoglobin is at once effected, therefore, the microscope, and especially the hæmometer is the only reliable source in determining positively and accurately the condition of affairs. I will here first mention the different surgical and gynæcological diseases in which the hæmometer has already demonstrated wonderful results.

(To be continued.)

COPPER amalgam still continues to divide the profession. Opinions are many—facts few. Dr. Ames argues that we heat and triturate it too much. Dr. Barnes contends that we do not heat and grind it enough. The *Items of Interest* says: "The *Ohio Journal* asks, 'Why does copper amalgam squeak?' We know! In its squeaking voice it is crying: 'Take me out! Take me out! I am a failure! I ought to turn black, but I can't in this mouth. Take me out!' Brethren, take heed to the voice of the copper amalgam."—*Ohio Journal.*

A PLEA FOR CONSERVATISM.*

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There are few men who possess minds so evenly balanced that they are enabled to view a subject from all the different standpoints, and, taking into consideration every factor that enters into the sum of the whole, deduce therefrom a fair and judicial estimate of the relative importance of each. One individual element assumes so close a relation to us that we see nothing else. A single angle presents itself to the vision, and gets so near as completely to shut out all view of other proportions, just as a finger's-end may be so close to the eye as to eclipse the whole world beside. This is especially true in all branches of medicine. There are such an infinite number of elements entering into the problem of pathological disturbances, each of which must in turn be taken up singly and carefully examined, that there is little wonder that every new agent presented should absorb attention for the time being, and monopolize a mind not sufficiently capacious to entertain more than one idea at a time. One single part of a great whole becomes so exaggerated by exclusive consideration that it engrosses the whole field, and everything else is lost to sight. Thus, one afflicted with some obscure, recondite disease, may apply in succession to all the medical specialists, and in turn be told that the source of his illness is in the lungs, the throat, the stomach, the nerves, the genitalia, the eyes, or the teeth. And the opinion will in each case be an honest one, for constant contemplation of one organ, or set of organs, has so exaggerated its importance that, remotely or immediately, they find it connected with every physical aberration.

When chemistry emerged from the dark ages of catalysis and spontaneous transmutation or change, and when was first observed what should have been known at the outset, that every chemical transition was the direct result of an active cause; when man obtained his initial glimpse into that wonderful microscopic world which so greatly transcends the microscopic in extent and interest; when he began to comprehend the molecular disturbances wrought through the proliferation of the vegetable fungi, and to get a little inkling of what was the true nature of those previously mysterious processes called fermentation and putrefaction, if he were the enthusiast that discoverers usually are, he imagined that the whole arcana of nature were now laid bare. Here was a new world of unknown vastness, and the influence of it upon the organic world of which its denizens were parasites was as yet unlimited by actual discovery, and imagination ran riot in the possibilities. These minute organisms might be the so long hidden cause of the unknown. Here might be found the key that would unlock the mysteries of nature. The cosmic egg was hatched. Microbes managed matter. Bacteria dominated disease, and pathology was but another name for a ferment. Corns and consumption were alike due to some specific micro-organism. The whole duty of man, professionally, was to get at the microbe and destroy him, and then hermetically to seal up the tissues against further infection. Everything else was lost to sight by many of the so-called progressive physicians, and septicism and antiseptics alone ruled the hour.

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In medicine the errors into which an unrestrained enthusiasm led such great men as Koch and Lister, and even Pasteur himself, have brought about something of a reaction, and it has been learned that every other study cannot be abandoned for the bacteriological laboratory, great and important as that department is. In dentistry we are approaching the same point. It was with difficulty that the great and sublime truths of which Miller first gave us a clear conception secured fair consideration. I well remember, and so will some of you, when in 1884, only seven years ago, this Association met in this very place, and when upon this floor I attempted to urge some of his views, I, with my friend Daboll, was fairly hooted down. We were howled at, and the wicked did gnash their teeth at us. Every time I opened my mouth one prominent member stopped it by hoarsely bawling, "I call the gentleman to order." But truth has made its way, and now the trouble is that the pendulum has swung to the opposite extremity, and upon this same floor I feel myself compelled to enter a protest against what has assumed the proportions of a craze. The microbe haunts us, and infinitely small though it be, it is large enough to eclipse every other factor. We are now as obscure in the clouds as we were before in the caves. Climbing out of the cellar of ignorance, we have not stopped at the first floor of reason, but have rushed into the garret of fanaticism and zealotry.

Let me not be misapprehended. I am not underrating the importance of a thorough study of microscopical biology, nor would I for a moment deprecate the influence of microbes in oral pathological conditions. But I do depreicate the idea that there is nothing else to be considered, and that antiseptics and germicides are the only remedies which our pharmacopœias should contain. I protest against the assumption that because Miller, as the result of his scientific investigations, proves that there is no special remedy that will insure an entire aseptic condition of the oral cavity, and that tooth-decay cannot be entirely prevented, that therefore all the splendid results of his years of investigation are barren and useless.

In a late journal a dentist insists that nothing has been gained in the last decade, because teeth still need to be filled, and alveolar abscess yet occasionally occurs. Look back, you gentlemen who have kept pace with the onward march of progress—look back and see what was the condition of dental pathological knowledge in 1881. Have we no reason to feel encouraged? Are we not now to a great extent the masters of disease? Does not the dentist who carefully and discriminatingly uses the knowledge of to-day, adding to it the nice manipulation upon which the practitioner of ten years ago depended,—does he not succeed the better for it?

The great trouble is that many men cannot imbibe a single draught of knowledge without becoming craniologically intoxicated. A single large idea overstimulates their intelligence, and they lose mental balance. There is something more than mere metrical jingle in the famous stanza from Pope,—

"A little learning is a dangerous thing;
Drink deep, or taste not the Pierian spring;
There shallow draughts intoxicate the brain,
And drinking largely sobers up again."

Intelligent and enthusiastic dentists, who have the ear of their confreres, have discoursed learnedly upon microbes and ferments, upon germicides and detergents, upon coagulants and non-coagulants, while the younger men, who were perhaps taking their first sip of the fascinating draught, or at least with less of experience and knowledge, listened with open ears and wondering eyes. Nothing was said of other conditions than that of septicism, because the speaker took it for granted that all were as well informed as himself, and that they would add the modifying provisions. A single factor seemed to be raised to a dominating position, and remedies new even to the chemists were specifically recommended, without a fair comprehension of their properties. Is it any wonder that in following such teaching mortifying failures resulted?

How long is it since immediate root-filling was a kind of craze, the result of just such enthusiastic but injudicious teaching? A new idea was allowed to run away with judgment. Theoretically, all that was necessary was depuration and sterilization. Young men ran off from the meetings, like newly hatched chicks with half the shell upon their backs, and essayed the new practice until sad experience taught them that there were other elements to be considered, and that the dental millennium had not yet arrived. Some of them have sat in sackcloth and ashes ever since, giving dental societies a wide berth, anathematizing those whom they believe to be false teachers, blind leaders of the blind, and all in the ditch together.

It seems to me time that we begin to consider the subject of antiseptic dental treatment from a more rational standpoint. Microbes cannot be utterly excluced from the mouth. They will penetrate cavities of decay despite the greatest precautions. Utter asepticism in any portion of the human economy is a dream that has no foundation in fact. At the International Medical Congress in London, in 1881, Sir Joseph Lister, who has given his name to a method of operative procedure, announced that the horrors of surgical interference were abolished, and that by means of the carbolic spray it was possible to operate under entirely aseptic conditions. But Ziegler, and Bantock, and Tait secured even greater success than did Lister, and they spurned his spray, being only sedulously careful as to cleanliness and irrigation. At the Congress held in Berlin last Summer, we who had listened to Professor Lister with so much suppressed emotion only nine years before, were astounded to hear him now say, "As regards the spray, I feel ashamed that I should ever have recommended it for the purpose of destroying the microbes of the air."

The practice recommended by some of our most intelligent dentists in the treatment of root-canals, it seems to me, looks toward the entire exclusion of microbes. Everything is managed with this end in view. The utmost stress is laid upon the most minute particulars, while other needed precautions are neglected. In cases of alveolar abscess we hear of nothing save detergents and antiseptics. It seems to be taken for granted that if microbes can be exterminated, nothing else need be done. In the capping of exposed pulps asepticism is made the only condition of success.

I wish again to say that I am not urging indifference to antiseptic treatment. I believe it to be absolutely essential to successful practice. But I do not think that it is the sole factor, and the only thing to be looked after. I do not believe that the entire absence of all organisms can ever be assured. I do not hold it possible to secure complete aseptic conditions by any external means or agents. We cannot control the processes of nature ; we can only influence them to a certain degree. We cannot, for instance, furnish the proximate principles of the body from without. We only can supply the proper pabulum, and from that allow the nutritive system to select and prepare its own material. The attempt to harden the bones or the teeth by giving phosphate of lime is a hopeless task, because it is not in accordance with physiological law, and it is quite as absurd to undertake the extermination from the tissues and organs of the body of all the micro-organisms, whether of a pathogenic or non-pathogenic nature. The oral cavity is never without microbes of various kinds.

The multiplication of remedies and the duplication and reduplication of methods will not compass the impossible. The more complicated the processes employed, the greater the opportunities for error. The absolute sterilization of dental instruments is impracticable. We may approximate it, but it is hopeless to attempt to destroy all spores without ruining the instrument. The germs of different fungi are too numerous and too widely diffused to be entirely eluded. Wherever air enters, there goes the possibility of infection, and air cannot be utterly excluded. Within the tissues, diffused throughout the blood, penetrating everywhere, the spores of the fungi are found, in health as well as in disease. There is no immunity from infection when an organ or a tissue shall have taken on a condition of atony. Man may fly to the uttermost parts of the earth, but there shall he meet with the destruction that wasteth at noonday. The microbe hath all lands for his own, and it is useless to attempt to escape his presence.

Does this absolve us from all attempts at asepticism ? By no means. The very fact of the universality of the microbe should stimulate us to greater precautions. That instruments may not be made absolutely sterile, is no excuse for the almost universal and criminal neglect of proper precautions. How many operators keep a sterilizing apparatus and faithfully use it? It is of no material use merely to dip a point into some solution and then call it sterilized. How many have a special apparatus for the purpose? And yet no man should be permitted to practice without something of the kind. While we cannot utterly banish micro-organisms, we have no right to be inoculating with specific pathogenic bacteria. I have seen many cases in which a previously healthy mouth became diseased after the filling of a tooth by some careless or ignorant dentist. I have under treatment now a very bad case of localized stomatitis, the result of the lack of proper and decent care on the part of a dentist. A beautiful and refined young lady was undoubtedly inoculated from unsterilized instruments that had been used in an affected mouth. We never know how susceptible an apparently healthy patient may be to infection of some pathogenic organism. Even animals, not domesticated, may have such a condition of atony as to subject them to the action of microbes from which it is usually supposed that they have immunity. I have the skull of an old male gorilla which had a very bad alveolar abscess, the result of caries of the teeth, and I have another skull of a female gorilla that suffered from undoubted pyorrhœa. I also have a case of exaggerated antral abscess in a gorilla. You know that this animal has never yet been kept in a state of captivity.

In a condition of entire health nature has made provision for the destruction of invading bacteria. Whether the theories of Metchnikoff be true, and the peculiar power to digest and devour them rests in the leucocytes of the blood, or whether microbicidic action may be found in some other function, we cannot now positively say. But we do know that until the tone of the system be in some way depressed, there is immunity from the usual pathogenic organism. That the spores of different ferments vary in virulence, is of course a fact, but that does not affect the truth of the principle.

A tooth that has lost its pulp, cannot be said to be in a normal condition. Yet in the healthy mouth, if proper precautions have been taken, and if the right mechanical measures for its protection shall have been employed, we know that it is secure against the attack of disease under ordinary circumstances. We know, that in many instances a pulp has been destroyed in the most slovenly way imaginable, without any regard even for decent cleanliness, a filling has been inserted over the devitalized pulp without even an attempt to remove the contents of the root-canal, and it has remained in an apparent good condition for years. We know that until within a comparatively short time the roots of teeth were filled without antiseptic precautions, because the condition was not then comprehended, and yet they were sometimes well saved. Westcott and Dwinelle, and their compeers, filled nerve canals before microbes and antiseptics were dreamed of, and they did it with success, too. Antiseptic treatment is not, then, always an essential. But Westcott and Dwinelle were not able to save as large a number of cases, nor were they with the incomplete comprehension of pathology which belonged to the fifth and sixth decades of the century, warranted in attempting the salvation of a class of teeth which, in the light of the further knowledge of this tenth decade, we do not hesitate to fill.

Thirty years ago there were very few who attempted the filling of root canals, for the men who were able to make delicate manipulation take the place of pathological knowledge were limited in number. Now almost every dentist who reads the journals attempts root treatment, depending upon following the methods laid down by those who pose as teachers. And it is just at this point that I desire to enter my protest against the half-teaching of the journals and societies when, affecting to discuss the whole of a given subject, only a single aspect of it is considered, and that is elevated into a matter of supreme, sole importance. I do not believe that it is sufficient that the cavity of decay should be deluged with detergents, saturated with germicides, and soaked with antiseptics. It is not enough that saliva should be excluded because of danger from infection. There are other reasons for it. The operation must be skillfully performed in yet another sense, and the manipulation must be perfect. The tissues about the tooth must not be injured by mangling blunders, any more than that they should be removed, as far as possible, from danger of septic infection. The filling should be judiciously chosen and properly inserted. The appropriate remedies to insure the restoration of the tissues should be employed. No use of germicides can atone for the lack of these and other manipulative measures. While septic conditions should be carefully looked after, even greater stress should be placed on hygiene and restorative measures, remembering that it is only in a state of comparative health that there is any security for the permanence of the aseptic condition.

I care little for coagulants or non-coagulants. Coagulation is certain in albumen when exposed to external agencies, and all the non-coagulants in the world cannot prevent it, except by its practical destruction. I care not to exclude all organisms, for I know that to be impossible. There are many which are not pathogenic in their character. It is idle to talk of danger from anærobic, deep-seated organisms, for they are usually harmless, and if they were not they cannot be avoided. I care not that every instrument that enters the pulp chamber, shall have been heated to a red heat, which is the only way completely to secure sterilization. We know that the material with which the root is filled is never made sterile, and if the manipulation is what it should be there is no necessity for it. We know that utter asepticism of the mouth is a hopeless dream, even if it were desirable. But we also know that cleanliness and dryness are essential, and we know that these are within the reach of every careful operator. We know, too, that comparative freedom from pathogenic microbes, is readily attainable, and the dentist who does not secure this is unworthy the name. We know that a state of asepticism is not the only one upon which health of the tissues depends, and it is quite as excusable to neglect one necessary precaution as another. A tooth may be as radically lost through imperfect manipulation or the use of bad material as by lack of proper medication. So, I again protest against the tone of some of our modern teaching, that seems to ignore all that is not new and unheard of by the average dentist, and that affects the obscure and the occult. I am willing to sacrifice my reputation for scholarship to that of good sense. I would rather have the approval of those who are really intelligent, than the applause of any number of groundlings. If I can be known as a safe, reliable, conservative, level-headed practitioner, I will resign all claims to daring, experimental, brilliant empiricism. I recognize the fact that it is necessary that there should be innovations and innovators, but I do not desire to be the patient of one. I honor those, who by patient, laborious investigation, elucidate the incontestable truths of science, but I cannot give my approbation to him who catches up the half of an idea, and by an absurd extravagance, manages to taint even the best cause. Therefore, while I eagerly seize upon new truths, I try to prove all things, and especially to hold fast to that which is good.

EXAMINING BOARDS IN NEW YORK SOCIETY.

Dr. Peirce says he is on record as being thoroughly in favor of examining boards. As a teacher of thirty years' standing, he could say that no one accepted with greater satisfaction than he the action of examining boards. From his earliest connection with schools as a teacher, he realized the great effort it required to withstand the temptation to grant degrees which had not been fully earned. It is one of the most difficult positions to fill without bias. The only complete remedy is that the degree shall not be conferred by the teacher, but by a board entirely independent of the source from which the education was obtained. The duty of the board is the protection of the public. The duty of the teacher is to guard well the efficiency of the school. Both are creatures of the State, but to the board especially should the Commonwealth look for protection from empiricism, and the value of the degree bearing the seal of the State. For this reason he is in favor of examining boards whose function shall be to designate those who shall practice dentistry.

There had been many suggestions made to him during the last year as to the position he should take, to harmonize the feeling existing between the schools and the examining boards. The dean of the Baltimore college takes the position that whenever a diploma has the indorsement of the examining board in the State, that diploma should be good throughout the United States. Now, the only way that can be brought about would be for the examining boards of each State to form a National board, and for this National board to indorse the diploma; then it would be good throughout the United States.

It has been claimed that equity requires every faculty to examine a student at any period of study, and, if qualified, to let him go forth as a practitioner. That is not the province of the faculty, but of the examining board. The student presents himself, and the board can say if he is or is not qualified; and if he is, he can practice. The faculty cannot do that, they are assailed by too many temptations to be allowed that privilege; it is a power that should be awarded only to an examining board.

He felt that he should be cautious in speech, for being closely allied with one school, whatever he said might be considered as showing some antipathy to some rival school; but he stood there simply as a teacher, and as such was decidedly in favor of the degrees being granted independently of the teachers, and thought that till we can arrive at that state we shall not be free from an undesirable class of practitioners.

Dr. Barrett: This subject has come to be a momentous one; it influences the whole question of the proper education of those who are to become members of the dental profession. In all educational departments there have been objections to faculties graduating their students. The difficulty is attributable to the fact that the faculty, which is the educating body, has a pecuniary as well as professional interest in the graduates, and in graduating the largest number of students. He had held for some time that no teaching faculty should be allowed to confer its own diploma. It is urged that they know best what are the qualifications of those who come up as candidates for graduation; but if an examining board is not competent to discover the qualifications of candidates, the appointment of such a board is a farce. New York has passed a law, which has become active, to the effect that the right to grant medical diplomas shall be vested in a board independent of the teaching faculties, and appointed by the State authorities; in other words, that the sole business of the college is to teach the student, and if a student is refused graduation by the examining board, it is an indication that he has not passed through the proper curriculum, or that the members of the faculty are incompetent and unqualified for their positions.

The board must be made up of men competent for the work, who have passed through a curriculum of a study that has made them familiar with the examinations of medical students. They are independent of everything, and simply grant a diploma to those who are competent.

It seems utterly unjust to grant a diploma on a mere examination. The specious plea that knowledge should be recognized wherever and however obtained, has been the cloak under which fraudulent diplomas have in all cases been issued. The business of the teacher is to teach, and not to distribute honors. It should be demanded that the student should have passed a proper course of study and spent a sufficient period of time to obtain proper knowledge before he comes before such a board.

The boards in the different States are working at cross-purposes instead of laboring together on a hard line; the board in one State disqualifying those who have passed an examination before the board of another State. When each State shall have a competent body to examine candidates for practice as well as for graduation, that board alone should have the power to grant diplomas. If the boards in the different States confer degrees under the same general law, it will be possible to have uniformity in examinations by the different boards, who are entirely independent of the schools, and there will be respect by one board for the opinion of another.

Dr. E. T. Darby said he would be very glad to see a National board of examiners, whose duty it would be to examine the graduates of all the dental colleges, but it seems impracticable. No board could be found to undertake such a task. There are strong arguments against allowing a faculty to graduate its own students. He would gladly relegate that duty to a board of examiners, but how is such a board to be appointed? Who are competent to undertake such a task? When the State Board in Pennsylvania was created, one of the provisions was that no one connected with a dental school should be a member of the board. At the time he was not connected with any dental college, but the year after he was elected to a professorship in one of the schools. Then the argument was that a professor in a dental school was the very man to examine, because he was accustomed to teach. He was retained on the board, and as vacancies occurred they were filled by the appointment of other college professors, because they were thought to be best qualified.

There was a feeling afterward that the colleges should not represent more than half the board, so the board was composed of three from the dental colleges and three from the profession at large. He had witnessed the examination of a student at one time by a gentleman who could not answer the questions himself—questions from a quiz book. It is an easy thing, it is said, for a man who knows a thing, to tell it; but it is not easy for all men to tell it in the same way. A student comes before an examiner and gives the method which he has been taught. He is asked how to fill a root-canal, and answers, "I fill it with chloride of zinc, or guttapercha." The examiner says he ought to fill it with iodoform or putty, and he "plucks" him because he did not know how to fill a root-canal.

He would gladly see created a board of examiners for the purpose of examining all students graduated from Maine to California, but how is such a board to be appointed?

Dr. Frank Abbott said that his mind had been very much disturbed over this question for many years. He had been teaching and examining men for over twenty-five years. Almost every day of his life he came in contact with students, and from the fact that it obliged him to examine them, he was almost sorry he was a teacher. He wished he might never have to examine another. Teaching is pleasant, as Dr. Shepard has said, but the examination is anything but pleasant; it is very disagreeable when one is obliged to say to a man, "My dear sir, what have you been doing the last two or three years to know so little as you do?" That same expression is frequently made to men who come up before faculties in dental schools.

He had taken quite a strong position against boards created by State laws for the examination of those who come into the State to practice, but he had recently changed his mind. State boards certainly have one merit, and that is, of sifting out the incompetent. If the question should come up in the State of New York to-day as to whether a board should examine all dentists desiring to practice in this State from the college with which he was connected, or from any other source, he thought he should vote for it.

He had noticed the statement with regard to one of the men that was rejected—that the ground was entirely gone over in twenty-five minutes.

Dr. Shepard (interrupting): That was in one chair only.

Dr. Abbott (resuming): Even so, twenty-five minutes is a very short time in which to find out what a man knows. Ten minutes might satisfy you that he knows; but to take twenty-five minutes only, and claim the ground was all gone over, in any one chair, in the practice of dentistry, seemed to him a rather short time. He could not do it, and he did not believe many other men could. It is difficult for one who is not teaching, and has no knowledge of what is taught in the schools, to question an applicant in accordance with what he has been taught.

He did not mean that one kind of anatomy is taught in one school and a different kind in another, or that different kinds of pathology are taught in different schools; but different methods of treatment are taught in the various schools, and the examiner should give a man a chance to make his own statement. As an instance, it is pretty well known that in his practice he differed very much from others. He uses rubber-dam probably only once in a thousand times, yet there are a great many men who say that a contour filling cannot be properly inserted without a rubber-dam, though some of the best fillings he had ever seen were put in before rubber-dam was thought of. His practice would probably be condemned by most examining boards, because most of them are composed of men who have gone into practice within the past twenty-five years.

The idea of a National board of examiners, he thought, could hardly be realized; but something ought to be done by which boards of examiners and the National association of faculties should work together in harmony. He thought a wrong thing was done, last summer, in naming the schools, the graduates of which had been rejected. It created a feeling that will make trouble, if it is persisted in.

It is a fact, well known to many teachers, that some students have ways of getting through their examinations that are mysterious. Some fifteen years ago, there was a student in the New York college who was very ignorant, and of low grade among his classmates. When his written answers came in they were wonderfully good. The faculty did not understand it, till some six months afterward, it leaked out that he had a friend, a graduate of the school some years before, who was a very bright fellow. The friend was outside the door, and the student sat near the door and passed the question under the door to him, which was answered and passed back, and the applicant put it in as his answer. That was done without the knowledge of a single man connected with the college. He did not suppose any college faculty is infallible, but all are liable to let men through who are not perfectly qualified. He thought the time had come when there should be a board outside of those who teach which should determine the qualifications of applicants.

Dr. S. H. Guilford: Ever since dentistry amounted to anything in this country the demand has been for advancement. In response to this demand colleges were organized. They filled their place in the beginning; were as good as the people then knew how to make them. After a while the demand for further advancement caused changes to be made. In the early days, men were graduated after an attendance on a course for five months each year for two years; and degrees were conferred on men of well-known ability who had not attended lectures at all, for the reason that those men, whatever their qualifications may have been when they entered the profession, had made their mark in the world themselves and had proved worthy to practice. After a while the profession said to the colleges: "This thing ought not to be; you have granted degrees to as many men as deserve it." The colleges abolished it. After that it was said that, though men should be graduated who had not attended lectures, there should be a distinction made in favor of men who had practiced a long while and acquired a part of their education outside of the colleges; and, therefore, many of the colleges agreed to accept a man who had been practicing for five years, and make that five years equivalent to one course of lectures. That continued for a while, and then the demands of the profession went further, and that plan was abolished. The colleges did as was recommended, and decreed that all students must study two full courses—in some cases a spring and fall course being obligatory, and in some conditional. Finally, the demand came to be made in stronger terms, by virtue of the authority of the American Association of Faculties, that all colleges represented in that association should require a course of three full years. He thought this history showed that the men who have been engaged in dental teaching have responded in good faith to the demands of the profession. The number of those desiring to attend college is on the increase. Last year we had in Philadelphia nearly eight hundred students in the dental colleges alone. It has been urged that we should have fewer colleges. But how is this to be accomplished? It is an easy thing to procure a charter for a dental college. If a number of reputable men ask for the privilege, it is granted. The profession has demanded a restriction in the number of colleges, but the number of educational institutions cannot be restricted by legal enactment. What course, then, shall we pursue, so there shall be fewer students and fewer graduates? He thought it could only be by taking steps to shut out some of the colleges.

The medical profession have been following the same line of thought that we have, and it has culminated in the passage of laws regulating the practice of medicine.

He had not yet arrived at the belief that a State board of examiners, is absolutely necessary to examine dental students, and thought that the time will come when a dental diploma shall mean everything it should mean. He thought that in all cases of theoretical examination by State boards the questions should be submitted in writing, and the questions and answers filed; then, when a college is suspected of graduating candidates unqualified to practice, the examination papers before the board, would show whether the applicant was qualified. In no other profession is a test of competency required after the diploma is granted. When a young man has studied law a definite length of time, and applies for examination, a board of examiners decides as to his competency, and he is admitted to the bar. His certificate allows him to practice at once. The same rule is followed in the ministerial profession.

If it is necessary to have a State examining board, how shall it be constituted? How shall the examinations be carried on? Under the bill now before the Legislature of Pennsylvania, a student coming up for examination draws a numbered slip and registers that number. It is presented to the board. His name and residence, and the institution from which he came, are unknown. The questions and answers are in writing, and are open to public inspection for from three to six months afterward, so if there is any doubt as to his being competent the record can be appealed to. All are treated alike; no distinction is made; no recognition of previous practice or reference to any school. The examining board renders its report, and says whether the applicant has passed or failed, and only after that does it become known who the candidate was. If we are to have dental laws, he thought they should be framed on that plan. As it is to-day, a student is graduated, and stands well, according to his professor. He comes before the board and is examined orally, and, as he answers, the board marks him as it thinks best. Perhaps he is rejected, and the news comes back to the college. The faculty say, "It is very strange; the man passed his examinations." But there is no record kept, and nothing to refer to. Would it not be better to have the examination in writing, so that others might judge as to the fitness of the questions and answers?

We are in a transition period. We believe all want to let as many good men into the profession as possible, and just as few who are incompetent; but in the future the barriers would be placed at the entrance of the colleges.

In regard to a uniformity of State laws: One State has a law and an examining board; another State has no law. How can we get uniformity of State laws? Only by having a National examining board, says one. But every State has the inherent right to frame its own laws. The United States will not pass an enactment requiring the same law in all the States.

Dr. Shepard: In Massachusetts a graduate from the ordinary law school, has no rights till he has been examined before the courts, and often graduates of those schools, are not admitted. In New York it was formerly the case that a graduate of the Columbia Law School, was admitted to practice on his diploma, but it is not so now. The graduate of that school has to pass the same examination as though he graduated from any other institute. In regard to ministers, everybody knows they are examined by a counsel or presbytery, but a man has to be ordained to the sacred office. He cannot be ordained till he has proven himself worthy before a jurisdictional body. Often, after examination, he is refused ordination, and he cannot administer the sacraments of the church till he has been ordained.

In Massachusetts a graduate of a school of pharmacy cannot be allowed to put up a prescription till he is examined. In Chicago a man who owns a steam engine, if only of two-horse power, cannot have it run except by a licensed engineer, who has been examined by the State board and authorized to run an engine.

There are one hundred and forty-nine medical colleges in the United States, and the literature of the medical profession is teeming with the fact that those schools are so numerous as to degrade medical education. The report from the State of Illinois goes over that ground and shows it up most thoroughly.

The past four years have witnessed a marvelous change, and the next four will witness a still greater change, and we shall finally have in the examining boards competent, skillful and practical examiners, who will have the confidence of all because of their fidelity to duty and to the profession. —*Cosmos.*

THERE are about 2,000 foreign students at German universities; 331 of them are from Russia, 293 from Austria. 225 are Swiss, and 436, the remainder, Americans.

CAMPHOR, A SOLVENT FOR IODOFORM.—Camphor increases the solubility of iodoform in alcohol and ether. While one hundred parts of alcohol ordinarily dissolve no more than one and one-fourth parts of iodoform, the same amount of a saturated solution of camphor, is capable of taking up as much as ten parts.—*Dental Register.*

FEVERS OF (a) FATIGUE, (b) EXHAUSTION, (c) NON-ELIMINATION.

In the course of a series of lectures on "The Chemical Factors in the Causation of Disease," Prof. Victor C. Vaughan, of the University of Michigan, discourses as follows on a phase or two of the subject that ought to have a personal interest to many dentists and a patient interest to very many more. It puts "prostration" on an intelligible basis:

That certain febrile conditions are autogenous there can be no doubt. These, like other diseases originating within the system, may be due to either of the following causes: *First*, There may be an excessive formation of poisonous substances in the body. Thus. Bouchard has shown that the urine excreted during the hours of activity is much more poisonous than that excreted during the hours of rest. Both physical and mental labor are accompanied by the formation of these deleterious bodies, and if the hours of labor, are prolonged, and those of rest shortened, there will be an accumulation of effete matters within the system. *Second*, The accumulation of the poisonous matters, may be due to deficient elimination. *Third*, Some organ whose duty it is to change harmful into harmless bodies may fail to properly perform its functions. Illustrations of diseased conditions arising from these several causes will be given.

(a) FATIGUE. First, we may mention fatigue fever, which is by no means uncommon, and from which the overworked physician not infrequently suffers. One works night and day for some time; elimination seems to proceed normally; but after a few days there is an elevation of temperature of from one to three degrees, the appetite is impaired, and then, if the opportunity for rest is at hand, sound and restful sleep is impossible. The tired man retires to his bed expecting to fall asleep immediately, but he tosses from side to side all night, or his sleep is fitful and unrefreshing, The brain is excited and refuses to be at rest. The senses are alert and all efforts to sink them in repose are unavailing. Fatigue fever is frequently observed in armies upon forced marches, especially if the troops are young and unaccustomed to service. Mosso has studied this fever in the Italian army. He states that in fatigue the blood is subjected to a process of decomposition brought about by the infiltration into it from the tissues of poisonous substances, which when injected into the circulation of healthy animals induce malaise and all the signs of excessive exhaustion. It is possible that in this decomposition of the blood the fibrin-ferment, which, according to Schmidt, is held in combination in the colorless corpuscles, is liberated ; and it has been shown by Edelburg, that the injection of small quantities of free fibrin-ferment into the blood causes fever, while the injection of larger quantities, is followed by the formation of thrombi, as has been demonstrated by the experiments of Edelburg, Bonne, Birk and Koehlar.

Fatigue fever is often accompanied, especially during the period of elevation, by chilly sensations, and consequently it is pronounced malarial and quinine is administered, but it does no good, often harm by increasing cerebral excitement. The proper treatment is prolonged rest with proper attention to elimination.

Then there is the fever of exhaustion, which differs from fatigue fever only in degree. It is brought on by prolonged exertion without sufficient rest and often without sufficient food. The healthy balance between the formation and elimination of effete matter is disturbed, and it may be weeks before it is re-established ; indeed, it may never be regained, for some of those cases terminate fatally. The fever of exhaustion may take on the typhus form, delirium may appear, muscular control of the bowels may be lost and death may result.

(b) Exhaustion. That the fever of exhaustion may be mistaken for typhoid by some of the ablest clinical teachers, is shown by Peter in the following quotation : "It was in 1852," says he, "when entering upon my clinical studies, and ardent in my attendance at the clinic of Chomel, I was witness of the following instance: A young man was received under the celebrated professor's charge. suffering from prostration, muscular pain and rachialgia. Chomel made the examination with all the care and attention used by him, then, as was also usual with him, in the presence of the patient, he gave the diagnosis in Latin, which was *aut febris peyerica aut varrola incipientis*, either typhoid fever or incipient small-pox. I felt rather dissatisfied at a diagnosis so little precise, by one so eminent in his art. The truth of the matter was, though Chomel was not aware of it, this young fellow, in a state of destitution, had walked from Compeign to Paris, sleeping by the wayside at night and nourishing himself with such refuse food as chance supplied.

It was under such circumstances the patient had developed febrile symptoms. The day after his admission, and simply from rest in bed, he felt better, and the day following he was altogether well."

That all cases of the fever do not terminate so rapidly as that instanced above by the great French teacher, is shown by one which I happen to have under my care at the present moment. A lady, rather frail in body, but without any organic disease, spent the greater part of the time, day and night, for ten days in the sick-room of her child, who died with diphtheria. Since the death of the child, the mother has been confined to her bed with a fever which varies from 99° to 102.5°. She has no soreness of throat or other evidences of infection with diphtheria. She has no symptoms of typhoid fever, and with the exception of slight constipation, which has been easily relieved, her bowels have remained in good condition. She took but little food during the sickness of the child, and has had no desire for food since. Her temperature is but slightly affected by two-grain doses of antifebrin, and the highest point reached each day, is very variable. The mind is clear and she has been altogether free from headache. Her temperature is lowered by a few hours' sleep. This condition has now continued for nineteen days. I have pronounced this a case of fever from exhaustion, and, if this diagnosis is not correct, I must admit that I do not understand the nature of the case.

A case similar to the above I saw some time ago in a young man who had been leading quite an inactive life as a student, and who did a very foolish thing in walking one day a distance of more than thirty miles. The next morning he had a fever, which varied from 99° to 103°, and which continued for more than one month. The physician in charge pronounced this a case of typhoid, but of the correctness of his diagnosis there was not the slightest evidence. In this instance quinine was first employed, but it increased the wakefulness and restlessness, and was followed by an elevation in the temperature.

I have known at least one case of this kind to terminate fatally, and a most thorough *post-mortem* examination failed to reveal any definite lesion.

(c) NON-ELIMINATION. Then, again, there is the fever of non-elimination, which all physicians of experience have observed. There is a feeling of languor, the head aches, the tongue is coated, the breath offensive, and the bowels constipated. The physician fears typhoid fever, but finds that a good, brisk cathartic dissipates all unpleasant symptoms, and the temperature falls to the normal. This fever is also liable to appear among those who are confined to bed from other causes. Brunton says: "No one who has watched cases of acute diseases, such as pneumonia, can have failed to see how a rise of temperature sometimes coincides with the occurrence of constipation, and is removed by opening the bowels." The surgeon and obstetrician have often had cause to rejoice when they have found a fever, which they feared indicated septicæmia, disappearing after free purgation.

Bouchard has shown that normal fæces contain a highly poisonous substance, which may be separated from them by dialysis, and which, when administered to rabbits, produce violent convulsions. He estimates that the amount of poisonous alkaloids formed in the intestines of a healthy man each twenty-four hours would be quite safficient to kill, if it was all absorbed. He proposes the term stercoræmia for that condition which results from arrest of excretion from the intestines.

It is more than probable that the poisons of the intestines are due to the bacteria which are normally present; but this would not exclude the fever of non-elimination from the list of autogenous diseases. The bacterial cells, which are normally present in the intestines, cannot be regarded as invaders from without.—*Journal of the American Medical Association.*

ABOUT NOSES.—In January last a difficult surgical operation was successfully performed in Decatur, by Dr. William Barnes, of that city, which attracted the attention of the profession and unfortunate people throughout the country. It was the transplanting of four cat ribs in the broken nose of Mrs. Addie L. Davis. The bones of the nose had decayed, leaving that member in a condition mortifying to the otherwise handsome lady. The bones were taken out by the surgeon and the cat's ribs inserted. The bridge of Mrs. Davis' nose is now solid and straight, and she is the happiest woman in Decatur. A similar operation was lately performed by Dr. Barnes, who made a new nose bridge for R. D. Rowe, of Las Vegas. Quite a number of people witnessed the operation while Rowe was under the influence of chloroform. It was known that the bone grafting in New York cases had failed because of the sloughing off of the flesh, but there has been no trouble whatever with the Decatur case. It has been in every way successful.—*Northwestern Medical Journal.*

CODE OF ETHICS, ARTICLE II, SECTION 3.

"It is unprofessional to resort to public advertisements, cards, hand-bills, posters or signs calling attention to peculiar styles of work, lowness of prices, special modes of operating, or to claim superiority over neighboring practitioners; to publish reports of cases or certificates in the public print; to go from house to house to solicit or perform operations; to circulate or recommend nostrums; or to perform any other similar acts."

Bearing upon the maintenance of professional character among practicing dentists, this section of the code adopted by the American Dental Association in 1866, ought to meet with the approval of all right-minded men. We confess, however, that we do not quite sympathize with the use that has been made of it, in its application to the few who have risen above the ordinary run of dentists, as inventors and discoverers. The late Dr. McQuillen, then editor of the *Cosmos*, opposed the code at the above convention, as "unnecessary for gentlemen, and its enforcement impracticable upon those who were not," and at a subsequent meeting of the Odontographic Society of Pennsylvania, a resolution was unanimously adopted, declining to accept it, upon the ground that it was an interference with the independence of local societies.

Circumstances may occur when it would, perhaps, be wiser to relax its stringency. For instance, a dentist, after years of investigation and the expenditure of thousands of dollars, unaided in any way by confreres or societies, perfects or invents a boon to the profession and the public. While rivals, it may be, in the same town, are reaping the reward of selfish devotion to practice and money-making investments outside of dentistry, he has impoverished himself and his family while in his researches. He does not propose to monopolize his discovery. His practice has been seriously curtailed. He loses his patients while he is in his laboratory. To ask him to give away his discovery to men who neither helped nor appreciated him is unreasonable; it is uncharitable. A rival who invents a new mowing machine is perfectly "proper," though he may never contribute an idea or an implement to his profession. There are scores of petty "inventions" which have no merit, and whose authors cannot pretend to be placed side by side with a Barnum or a Land. But when a dentist devises or discovers something which is generally recognized as valuable, and which his confreres are glad to obtain; when societies ask him and pay him to give clinics, and, in spite of arrogant sneer, he demonstrates its value, his effort merits open and fair encouragement. If the framers of the code intended it otherwise, why was the resolution offered in 1867, to give a prize of $5,000 to any experimenter who produced a permanent white plastic filling? In 1870, at the Nashville meeting, Prof. Buckingham offered an amendment to the constitution, as follows: "No person shall be a member of this Association who holds a dental patent, or is, or shall be interested in one." The motion was lost. At the same meeting $1,000 was voted to the late Dr. Barnum for his discovery of the rubber dam. Dr. Barnum died poor. If we are to expect our discoverers to spend their lives and money for our profit, we must devise some better way of remunerating them than paltry testimonials and votes of thanks. The story of Dr. Barnum is not an isolated one. Some of the most critical and arrogant disparagers of patentees never did an unselfish thing for the profession. When an inventor is solicited and paid to exhibit his new ideas, he should at least not be treated like a malefactor, whose genius we are hungry to use, but whose "methods" may not square with our convictions. If poverty is to be even the chance reward of genius, codes of ethics are tyrannical. Members of societies who depart from the code, have no right to complain if they are forced to conform to them, or forced to retire. But it seems to us that an inventive genius merits some substantial reward for the labors of a lifetime. How shall we encourage this, and yet keep such men in our societies?—*Ed. in Dominion Dental Journal.* *See Page 108.

MEMBERSHIP IN THE AMERICAN MEDICAL ASSOCIATION.—This is obtainable, at any time, by a member of any State or local Medical Society which is entitled to send delegates to the Association. All that is necessary is for the applicant to write to the Treasurer of the Association, Dr. Richard J. Dunglison, Lock Box 1274, Philadelphia, Pa., sending him a certificate or statement that he is in good standing in his own society, signed by the President or Secretary of said society, with five dollars for annual dues. Attendance as a delegate at an annual meeting of the Association is not necessary in order to obtain membership. On receipt of the above amount the weekly journal of the Association will be forwarded regularly.—*Dental Advertiser.*

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EDITORIAL.

REVIEW,

NITROUS OXIDE GAS, AND THE TWO GAS LIGHTS,

DRS. THOMAS AND GILFORD.

At a joint meeting of the State Dental Associations of Pennsylvania and New Jersey, held at Asbury Park, N. J., July 15. 1891, a paper was read by Dr. John D. Thomas, and discussed mainly by Dr. Gilford, both of Philadelphia, and published in the November number of the *Dental Cosmos*, (we will not say for the benefit of dealers in gas appliances and nitrous oxide gas). which contains some remarkably cool, presumptious, extravagant and erratic statements, which are likely to be misleading and detrimental to science and to the professions at large, and which it behooves some one (in the interest of science and mankind) to expose to the light of truth and the sober judgment of those who deal with life and health in their efforts to relieve suffering humanity.

It has been said that the continued use of nitrous oxide gas in Philadelphia and adjacant towns, is largely due to the teachings and influence of the late Dr. Jas. W. White, then prominently indentified with the S. S. White Dental Manufacturing Company, and to·

the above named Drs. Thomas and Gilford, who have been the leading advocates of nitrous oxide gas for painless extraction of teeth. From the prominent positions of these men and their hold especially on the dental profession, their enunciations are likely to be listened to with respect, without calling in question the motives which may actuate in the same. Hence, if allowed to pass unexposed, great harm would undoubtedly result to science and humanity.

It is an easy matter to make flippant, arrogant statements, but frequently a difficult task to substantiate the same. The most extravagant, erratic and startling statements do not always come from the most ignorgant and obscure in the walks of life. Therefore, if we would advance in knowledge of any science, we must think deep, and investigate through to "*bed rock.*" Many think and talk *about* science, but few think and investigate through to fundamental laws. Let the sharp arrows of thought and investigation pierce every statement and teaching, that they may be held up to the light of truth, that no false therories or rotten timbers be placed in our temple of wisdom, or our house of refuge for the suffering. If on this plane the reader will nerve up, we will gently introduce the first startling statement in the essay of Dr. Thomas. Speaking of nitrous oxide, he says, "It grew from the first in popularity, and has continued to do so, until to-day it is regarded by every one as the safest of all anæsthetics, and pre-eminently the most desirable for dental purposes." "*By every one ! !*"

How about the thousands of gas apparatuses stored away like so many old tin cans, all over the country? How about the thousands of dentists who say they never want to look into the face of any one again asphyxiated with gas? Again the doctor says, "That nitrous oxide is a perfectly safe anæsthetic—safe, I mean from fatal consequences—seems hardly to admit of a question."

It will be observed that the Doctor is continuously calling nitrous oxide gas an anæsthetic, while admitting that the absence of sensation is brought about by robbing the blood of the necessary free oxygen to support combustion and sustain life. Like many others, he evidently confounds asphyxia with anæsthesia, and anæsthesia with asphyxia, and does not seem to recognize the definite physical condition of either, and consequently does not know what agency is necessary to produce either condition. If the Doctor's mind be open to conviction, we shall be most happy to assist him out of his dilemma, and on to the higher elysian plane of physical diagnosis.

First, determine in your own mind definitely, precisely what physical condition is properly called anæsthesia. Then what precise physical condition should be known as asphyxia. Then, know in what respects these conditions resembled each other and in what respects they differ from each other. Most of the lexicographers define anæsthesia as a "a physical condition in which there is an absence of sensation" without any other qualifying words. But if this be a correct definition, then death is anæsthesia, then asphyxia is anæsthesia, then syncope is anæsthesia, then paralysis of nerve center is anæsthesia. Then if I should paralyze a man with a club that club must necessarily be an anæsthetic. But no intelligent dentist or physician will ever want either of these physical conditions for a safe surgical operation and consequently, should not be named anæsthesia. There is another physical condition that should be properly and correctly named anæsthesia. And that we can, and must of necessity, define as "a physical condition in which the *force* and *functions* of life, are in continuance under modification whereby an absence of sensation is produced." Anæsthesia is the opposite, or negative of æsthesia. Æsthesia has reference to a physical condition in which there is sensation, or perception by the senses. But if the force and functions of life, were not in continuance, there could be no perception of sensation, or æsthesia. Hence, if anæsthesia means the opposite of æsthesia or sensation, there must be necessarily in anæsthesia—the continuance of the force and functions of life, but deprived of sensation. And just here is where most of lexicographers have failed to discriminate in giving their definitions of anæsthesia. But "asphyxia is a physical condition in which the force and functions of life are *suspended* or *abrogated*, whereby an absence of sensation is attained." The force of life, or that out of which *vital force* is generated, is *free oxygen*. This you must continuously supply in producing anæsthesia in sufficient quantum to support combustion and sustain life, and it is the all important element or factor in the anæsthetic, and without which we cannot have an anæsthetic. No matter how much this or that may be called an anæsthetic, unless there be sufficient free oxygen to supply in due quantum, the red corpuscles to the blood to sustain life, it is either an asphyxiating or paralyzing agent. There can be no exception to this. Asphyxia can only be produced by robbing the blood of its free oxygen. It is estimated, that we must reduce the quantity of oxygen in the blood to about two per cent. before we can have asphyxia. But this necessary percentage will vary in different patients in accordance with temperaments and nervous conditions. In nitrous oxide gas, we have no *free oxygen*, nor even oxygen. It is a chemical combination and not one particle of oxygen, can be imparted to the blood, as there is not sufficient heat in an animal, or a plant to decompose the two chemical elements and to set the oxygen free. Therefore, nitrous oxide will neither support combustion, nor sustain either vegetable or animal life. The evidence of asphyxia, is black blood, which manifests itself in purpleness in the face, followed by deathly pallor. As the English savant, Dr. Richardson, says: "It is the first stage of death," and that "the use of nitrous oxide gas for the pretended purpose of producing anæsthesia, should be prohibited by law." We can produce asphyxia and death just as soon and no sooner with nitrogen gas, or carbonic acid gas, or olyphiant gas as with nitrous oxide. This has been repeatedly demonstrated by placing small animals and birds under the bell jar with these various gases. In anæsthesia there is no purpleness nor deathly pallor.

Another evidence of asphyxia is the rigidity of muscle. But again Dr. Thomas says (speaking of the effects of nitrous oxide gas), "In complete anæsthesia (Asphyxia, Editor) the muscular system becomes more or less rigid, and unless the prop is used, the time necessary for the operation is lost while endeavoring to force the mouth open." But the tendency of anæsthesia or narcosis is to relax the muscles. In the face of these uncontrovertible facts, will our earnest advocates of nitrous oxide still further risk their reputation by persisting in the statements, "that nitrous oxide is a perfectly safe anæsthetic?" and that "nitrous oxide gas is a narcotic?" If a narcotic, then it would produce narcosis; and if it produces narcosis or anæsthesia, then the tendency would be to relax the muscles and no discoloration would be visible. Pray, Doctor, tell us what evidence you have of its being a narcotic?

We freely admit that you can carry thousands of animals and human beings into various stages of death, and then restore them to life. But it cannot be admitted that this can be done without injury to the nervous and physical constitution. No intelligent physician or dentist will knowingly hazard his reputation by making such statements without some valued consideration.

Again, the Essayist states, "There is no record by which it can be accurately ascertained how many people have taken it, since it was first introduced in 1843; but the latest, and probably most nearly correct computation, is that given by the late Dr. J. W. White in Dr. W. C. Wood's paper upon anæsthesia, read before the Berlin Medical Congress in 1890, in which it is estimated that fully 750,000 people annually inhale it in this country alone. We will simply submit to the better judgment of the intelligent reader as to whether it is probable that even this vast number of people have even visited the dentists of the United States to have teeth removed. And as to whether on an average of more than one out of every hundred of these which have had teeth removed would have taken nitrous oxide gas. Hundreds of towns in the south and in the west, and many towns in the north and east do not have gas administered. It is true that when nitrous oxide gas was first introduced, it was thought to be an anæsthetic, and under that impulse, it had its run in most sections of the United States, but as its true character became known, it has been dropping out of use gradually."

There is an old adage in physics, that "desperate cases require desperate means," desperate figures and desperate statements to support.

Is it not remarkable that in the supposed interest of science the learned Doctor could not find more than eleven deaths in any way connected with the use of nitrous oxide gas, and no insanity nor nervous prostration? Not more than two of these deaths that have occurred in this country. He don't seem to have remembered of any other fatalities connected with the use of nitrous oxide, not even what has occurred in his own office."

Then another valuable plea for the use of this nitrous oxide, is presented in the discussion of Dr. Thomas' paper by our friend, Prof. S. W. Gilford D. D. S., of Philadelphia, in the following:— "Another point to be considered, is its relation to the ordinary atmospheric air. Both these substances, nitrous oxide gas and atmospheric air are composed of nitrogen and oxygen. Atmospheric air consisting of four parts nitrogen and one part oxygen, and nitrous oxide gas of one part nitrogen and two parts oxygen." "Could the professor not present the same plea for the use of nitric acid (crystal form) $N. O.^5$ or any one of the five different chemical combinations of nitrogen and oxygen. But later on he seems o partially redeem himself when he says: "In air we have nitrogen and oxygen simply mixed, with no chemical union whatever; whereas in nitrous oxide gas we have an absolute chemical combination, and we cannot under ordinary circumstances, separate the two. So that while we breath the air which contains a certain proportion of oyxgen, that oxygen is taken up by the blood in the lungs and carried through the system and does its proper work. When we breath into our lungs nitrous oxide gas, it is carried into the system as nitrous oxide gas, and is eliminated as such. The two elements are not separated at all. In early days it was noticed when gas was given from an ordinary gas-bag and inhaler, that when the inhalation was continued for a little while the eyelids and lips of the patient became peculiarly purple and the face assumed a singular color. That of course indicated a certain amount of danger. And it showed that the cells in the lungs, were being filled with a substance that prevented the admission of oxygen. It was reasoned that it must produce its effect in one of two ways—that it was filling the lungs to the exclusion of atmospheric oxygen, or else, producing an effect upon the brain. It was supposed that as nitrous oxide gas contained an excess of oxygen over atmospheric air, it stimulated the brain; but when it was found out that it passed off as nitrous oxide, not losing any of its oxygen, that idea had to be abandoned."

But on immediately following the above paragraph, in which the Doctor clearly, truthfully and forcibly described nitrous oxide gas as a non-supporter of combustion; and as a devitalizer in its mission in the blood, he makes this startling statement: "Nitrous oxide acts as a powerful stimulant, and when the system is exhilarated beyond the feeling of pain, it naturally produces an effect somewhat similar to hysterics.

Can there be anything more paradoxical? Nitrous oxide, a non-supporter of combustion and a devitalizer, and yet, "acts as a powerful stimulant," and "produces an effect somewhat similar to hysterics." Hysterics (we believe) is admitted to be the result of nervous prostration, one of the legitimate results of asphyxia.

Dr. W. A. Conrad, of St. Louis, in his remarks on the essay, says: "I have in mind quite a number of cases in which I firmly believe, as an honest man, that the nervous system of these patients was permanently impaired by the administration of nitrous oxide. I am sorry to see that two great societies, having in their membership gentlemen who are intelligent, successful practitioners of dentistry, would allow a paper of this kind to pass without protest?"

Dr. S. A. Watterman, of New York, in his paper read at a meeting of the American Dental Convention, the Southern Dental Association, and the Dental Society of the State of Maryland, August 16, 1877, and which has been considered one of the best essays ever written, says, speaking of nitrous oxide gas: "Let us begin with this gas, the so called laughing gas, the one so extensively used by dentists, and by many considered a serviceable, harmless agent. Now let us logically apply all these ascertained facts to our case in hand, in order to learn how this gas produces its effects upon the economy. It deprives the blood of its oxygen and enters into a close combination with its crystalizable material; so bound, it disables this latter to absorb oxygen from the air or to supply it to the oxidizable tissues of the economy.

In Prayer's experiments, we have seen that the dogs, when permitted to inhale oxygen at the highest stage of the dispnœa, they become rapidly as well as ever. Not so after the inhalation of nitrous oxide gas. A certain effect upon the blood has taken place, often unimportant and transient, at other times more permanent and grave, sufficient at times to endanger life itself.

Thus we are forced to acknowledge that the application of this gas is far from being safe and harmless; that on the contrary it is pregnant with grave consequences. These facts ruthlessly destroy the infatuation that the inhalation of nitrous oxide gas is a harmless process; a process which any man, educated or not educated, may carry on without danger of destroying life. The recent death which occurred at Exeter, on the afternoon of January 22d, of this year, furnishes a lesson not to be forgotten. The gas was administered by Dr. F. F. Mason, for the purpose of the painless extraction of a large upper molar tooth. The lady, Miss Wyndham, was about 38 years of age, in good health. Her physician, Dr. Pattison, was present. Gas from the same source had been administered to other patients, so that its quality could not be impugned. She took the gas in the usual way, without any symptoms to excite uneasiness. At the proper degree of insensibility the gas was stopped and the tooth extracted. It was not until after the operation was completed that anything unusual happened. Her face suddenly became livid and the features began to swell, and she seemed to be quite unconscious. She breathed two or three times and in a few moments her pulse ceased to beat. All attempts to restore her were fruitless. There was no obstruction to the air passages, and the tongue was protruded while she still respired. "From no agent has there been so many hair breadth escapes from death as from this gas, and probably of late some persons every day have been brought within the minutest line of danger to which Miss Wyndham succumbed."

We learn this most important lesson that we have a great deal to learn before we shall have perfected anæsthetic agents. Toward such learning the reintroduction of nitrous oxide gas has been a serious check. Nitrous oxide gas is indeed not a true anæsthetic at all. A true anæsthetic is an agent that suspends common sensibility without, by any necessity, interfering with those organic processes on the continuance of which life depends. Nitrous oxide gas acts by suspending one of the most important organic processes, that of respiration. The insensibility produced by this gas is afforded during an interval of partial death. This interval, doubtful, transient, dangerous, may allow less time for a short operation, and suspending the inhalation the function may return, but that it may never return the above case furnishes a lamentable proof.

"No intelligent observer, who ever witnessed the ghastly cyanosed appearance of persons who have inhaled this gas until its anæsthetic (asphyxiating—Ed.) effects are produced, will deny that the ensemble of symptoms betokens a powerful influence upon the blood mass which continues for many hours and days. I have seen some cases where the inhalation of this gas, was followed by pulmonary, and cardiac diseases and death. The profession at large may yet learn to modify its opinion regarding its freedom from danger after its application."

You may remind me that in a dental institution, in New York, we are shown a gigantic roll, containing the names of many thousands who have inhaled this gas there, so far, without any direct fatal effect. But how is it with after effects? The institution referred to keeps no record of what becomes of its patients afterwards. One of my fatal cases—dying from after effects—had inhaled the gas there three or four months previous. She was a perfectly healthy woman before the inhalation, and her disease began right after it. Other well authenticated cases are not wanted to prove, that nervous disorders of many kinds and a train of organic diseases follow its exhibition. Dr. Frank Hamilton, of New York, attended a case of incurable epilepsy, directly produced by the inhalation of this gas. Dr, F. R. Thomas, in his treatise on nitrous oxide gas, says: "It resembles strongly in its effect an attack of congestive apoplexy. Many are deprived of sleep long afterwards, and complain of unremitting headaches; nor are instances rare where, after its use, vertigo, syncope, melancholy, insomnia, convulsions, hysteria and irregular heart's action, could be attributed directly to its use.

Joylet and Blanche (*Archives de Physiologue*, *v. July* 1873, p. 364) have obtained the following results from their experiments on this subject: "Chemically pure nitrous oxide will not support the respiration even of animals or plants, as they cannot decompose the gas. When breathed in a pure state by animals, it causes asphyxia and death, with all the symptoms usually occasioned either by strangulation or by the respiration of an inert gas, such as nitrogen or hydrogen. Nitrous oxide causes death in nearly the same time as these other asphyxiating agents. Nitrous oxide has no special anæsthetic action.

The anæthesia (asphyxia—Ed.) which it may produce when inhaled in a pure condition, is only due to want of oxygen in the blood. Insensibility appears when the oxygen in the arterial blood is reduced to less than two or three per cent. Arterial blood, is then very dark, and contains thirty to forty per cent. of nitrous oxide. Animals can live and show no alterations of sensibility while breathing mixtures of nitrous oxide and oxygen in the same proportion as nitrogen and oxygen in the air. The arterial blood then contains about thirty-five per cent. of nitrous oxide. Birds placed under a bell jar filled with this mixture, behave exactly like those placed in a jar of the same size filled with air, and die after having exhausted the oxygen to a similar extent, and formed a similar amount of carbonic acid. As nitrous oxide is an irrespirable gas, and does not possess the anæesthetic properties which have been attributed to it, the authors conclude that its employment cannot but be dangerous and ought on this account, to be excluded from medical practice."

Many in the medical and dental profession have yet to learn the vast and yet all important difference between asphyxia and anæsthesia. The former is the result of the abrogation or suspension of the forces and functions of life, while the latter is produced by the continuation of these forces and functions under modification of medico-chemical agencies. Asphyxia is the first step in at death's door, while anæsthesia is a condition in the continued enjoyment of the force and functions of life without the sensation of feeling.

Therefore, permit us to call your attention to the fact, that it is of paramount importance that you should positively know and select the safest physiological condition for your patient during surgical operations. If you would have the forces and functions of life continue under modifications, whereby sensation is destroyed, then you want anæsthesia. If you would have the forces and functions of life suspended, abrogated or cut off, then you want asphyxia as the condition. That which supports combustion and sustains life, either vegetable or animal, and really is the force of life, is oxygen in a free state. This you find in the atmosphere, and it is the only element under heaven that will sustain life. If this be true, then you cannot have an anæsthetic without this all important element. The narcotic element is subordinate, and yet, quite convenient and useful in producing the required condition, but not absolutely necessary, as we can produce anæsthesia in some persons by the rapid inhalation of air. Remember that chloroform, ether, etc., are not anæsthetics, though commonly so called. They may be the subordinate element in the anæsthetic. The all important element is the free oxygen, which is obtained with the atmosphere. The air is charged with the suitable narcotic, and the anæsthetic is "narcotized air." Aerated chloroform and aerated ether, etc., may be anæsthetics, but only anæsthetics when there is enough air to furnish sufficient free oxygen to supply the red corpuscles in the blood in sufficient quantity to support combustion and sustain life. Otherwise they would be only asphyxiating or paralyzing agencies.

ETHICS.

In our present number we publish an editorial from the *Dominion Dental Journal* on "Code of Ethics, Article II, Section 3," also, an editorial criticism from the *Dental Advertizer* and now beg the indulgence of the reader in a brief say of The Dental and Surgical Microcosm, on the criticism of the critic. That we may not puzzle our good natured Dr. Barrett of the *Dental Advertizer* to find out "for just what we are pleading," we will frankly admit in the incipiency that we are "pleading" for just what our beloved brother is in his excellent article on "conservatism" which we prize so highly that we give it room in this issue of the Dental and Surgical Microcosm.

If the reader will kindly read the Doctors' valuable paper on "conservatism" in another column, and then read his criticism on the *Dominion Dental Journal*, he will have a good illustration of the proverb that "it is easier to see the mote in thy brother's eye than to discern the beam in thine own eye." Yet such is humanity all the world over.

The good Doctor frankly admits that "there is nothing essentially unprofessional in the taking out of patents;" and very likely would admit that it is just as proper for a professional man to take out patents on any process, or mechanism that he may have developed pertaining to any science or art, as it would be for him to take out a copyright on any book or pamphlet which he may have written pertaining to the same. Yet, he would not encourage before a dental society the man who advertises his developement, for which he may have obtained patents, while he would gladly encourage the man who has obtained a copyright on his book or essay, and advertises no matter how much. Then, if there is nothing essentially unprofessional in the taking out of patents and if the object of a patent on a process or mechanism, is to afford a compensation to the patentee, will the doctor tell us how the patentee can obtain for the use of the process that he has developed and for which he has obtained a patent any monied consideration other than by leasing said process? But the doctor objects to this odious office license business. I remember that the parties who desired to use the Bessemer Process in making steel objected to "the odious license business with all its detestable espionage," also, but stern fate was upon them either not to use the process, or pay a royalty in the shape of taking out a license. Then, that they could have the financial advantage they took out licenses. But no doubt the Doctor would reply that the Bessemer process did not pertain to a profession. Did it ever occur to our extreme ethical man, that the discountenancing of our professional brethren in the introduction and sale of their inventions, has a direct tendency to force them to dispose of their patents to business men outside of the profession who are much more apt to impose upon the profession and unjustly extort money from them? If so, then can the Doctor not see that our Canadian brother is making an appeal to rescue the valuable patents from just such associations as the Goodyear Dental Vulcanite

Company and the International Tooth Crown Company, whose extortions have made the word license odious to the dental profession?

The dental profession is composed principally of *gentlemen*, who do not ask the benefits of any man's labor, without a just compensation for the same. They are willing to pay a royalty for the valuable developments, and don't matter whether it be secured by a license for the use of the patented process, or a higher price for the patented mechanism or copyrighted book. But the critic objects to the patentee in the dental profession, legitimately advertising his product or invention. He would strip him of all business rights and privileges, and thus force him (if he would be paid for his labor), either to go out of the profession or to dispose of his patent to persons who are out of the profession. Who will say that this is not the inevitable? Who will say that such a course would not be a *curse* to the profession? Will the doctor not pause, reflect and then gently retrace to the ground of conservatism upon which he has so manfully developed himself? "Consistency, thou art a jewel," a diamond, a royal diadem, if thou wilt stand on thine own premises.

If our ingenious brother Land has developed a valuable process of fine porcelain art work at an expense of over $3,000, which he claims, and if his brethren who recognize the worth of his process and are willing to compensate the doctor for his expense and labor in his valuable invention, by paying for a license for the use of the same, I can't see what right any combination of dentists have to interfere with that business transaction. If it be solely on the ground that they belong to an association of brethren who have adopted a code of ethics containing an article which prohibits a brother member, or brother dentist taking out patents on his inventions, or copyrights on his writings, to secure compensation for his labors, and if the prevention will retard progress in the arts and sciences connected with the dental profession, then such article is a curse to the profession and to society at large, and the sooner it be abolished the better for humanity and the profession. But I do not thus interpret the article in Code of Ethics in question. It neither prohibits a member of the association from obtaining patent rights or copyrights, nor from advertising their inventions in a true business like and gentlemanly manner.

Advertising is a proper legitimate medium of making known to the community the commodity, process, or both, by which not only may the inventor be justly compensated for his labor and talent, but the profession and the laity may also be benefitted to the extent of the value of the invention. Advertising *per se* by a professional man does not savor of quackery any more than the practice of medicine, or of dentistry does of death. It is the contents of the advertisement or the pill that causes the sickness or health, life or death. Any deception, misrepresentation or prevarication, any announcement of low prices as the inducement for professional services, or claims of superiority over neighboring practitioners, detracts from proper professional dignity, has a tendency to harm the standing of the profession, and discourage progress in the sciences and arts of the same, and therefore, should not be tolerated in the members of the profession. Such nauseate, and contain the elements of death rather than health and life. On the other hand, to prevent making known by proper judicious and gentlemanly advertising the merits of a process, appliance or book, does unquestionably retard progress in the arts and sciences of the profession, as much so as to prevent the government from offering compensation to the inventor or writer by way of granting exclusive right to the product of the genius and labor. Our government has wisely enacted for the encouragement of the better development of arts and sciences that special rights should be granted to the inventor, and the man or combination of men who will antagonize these wise provisions, or prevent the proper judicious advertising of the same that the public may learn of, and reap the benefits of these inventions, are alike guilty, and should be held amenable to the laws of the government that has enacted these special laws, and has created these wise provisions.

We would modestly suggest to the Commmittee of the World's Columbian Exposition, the propriety of erecting a special appropriate building with all necessary conveniences for the exhibition of all appliances, machinery, works of art and the sciences connected with or applicable to the medical and dental profession. Such a building would greatly stimulate and facilitate the work of both professions, and thereby aid in developing the arts and sciences pertaining to both the professions.

EDITORIAL REVIEW.

OF Lawrence Turnbull, M. D. P.·H. G., on "Deaths from Chloroform and Ether since the Hyderabad Commissions, with Conclusions," and the Work of the "Hyderabad Commission," continued from No. 2, vol. I, pp. 123.

That they have failed to properly distinguish these physical conditions and the causes of the widely differing and opposite conditions, is clearly manifest in their statements. The commissioners state that one of their objects was to discover—"the modifications in the effects of the anæsthetics, which result from (*a*) asphyxia in varying degrees, and produced by various means (*b*) from the use of drugs, such as morphine, atrophine, physostigmine and others."

Here mark the expression, "asphyxia in various degrees, and produced by various means." "By various means." But by the eternal laws of nature there is absolutely only one way that asphyxia can be produced, and that is by robbing the blood of the free oxygen, that is absolutely necessary to support combustion and sustain life. If they should not have sufficient atmospheric air in the proposed anæsthetic to supply in due quantum the red corpuscles of the blood to sustain life, they unquestionably, would only have an asphyxiating agent, and not an anæsthetic. But on the other hand, if they administer all the time an anæsthetic, then by the same eternal laws of nature they get anæsthesia and not asphyxia. Hence, it is clearly seen that they do not properly reconize these respective conditions, and the agencies absolutely necessary to produce these widely differing conditions.

Then Dr. Turnbull in speaking of the work of the Hyderabad Commissioners says: "We will only state in brief, the practical conclusions arrived at as to the effects of chloroform. "That in every instance the respiration stopped before the heart.' and all that was necessary for safety was to attend to that alone. Soon after the publication of the views thus expressed, several practical English chloroformists gave their opinion, founded on professional experience, that chloroform was by no means to be considered safe by simply attending to the respiration, and that the heart still played a most important part in the deaths, as may be seen from the numerous deaths from syncope given in our tables.

With this view, I have made a most careful collection of all the deaths, both from chloroform and ether, from every available source, assisted by several friends. These forty-three deaths have been arranged in a tabular form, giving the name, age, history, nature of operation, anæsthesia (the learned doctor no doubt means anæsthetic, Ed.) used, amount used, apparatus employed, posture, how long under influence, whether heart or respiration stopped first, means to resuscitate, how long continued, post-mortem, cause of death and references.

The whole number of deaths from chloroform and ether are forty-three. Of this number, thirty-nine were deaths from chloroform and four from ether. In five cases, the cause of death was syncope from chloroform, and in thirteen cases the heart stopped first. In ten cases the respiration stopped first, and in four cases the heart and respiration ceased at the same time. In one case cyanosis; no pulse. In twelve of the cases it is not stated which stopped first.

The cause of death in case 37, was due to some peculiar idiosyncrasy. In No. 22, paralysis of the pneumogastric nerve, the direct effect of the chloroform, superinduced by efforts at vomiting. After a careful consideration of the report of this case, and, as there was cyanosis after vomiting, we suspected suffocation, but this cannot be confirmed, as there was no autopsy, In case 20, there was given as cause of death, "Reflex paralysis of the heart," but there was no post-mortem to confirm this state."

Is it not plainly to be seen from these statements that even our American savant does not discriminate and recognize definitely physical conditions and causes of conditions? Is it not all important in these investigations that physical diagnosis be clear, precise and unerring? That there be no uncertain or meaningless words or phrases used either to designate the physical condition or the cause or causes of the condition? What knowledge can anyone obtain of the cause of death from such expressions as: "The cause of death in case 37 was due to some peculiar idiosyncrasy." Why not say the cause of death was not known? Or that other equally intelligent expression: "Died from heart failure?" Who ever knew of a death without heart failure? Will the Doctor not kindly enlighten us as to how chloroform can produce syncope? We know how by chemical action on the pneumogastric nerve it may produce paralysis of the nerve centre or partial paralysis. But how it can produce syncope when it is generally considered that that condition is brought on by the effect of the action of the mind on the pneumogastric nerve of the stomach, producing revultion in nervral circulation and nausea, followed by its reflex action on the medulla, causing partial paralysis or syncope. But if chloroform can produce syncope, then electricity or a club can produce the same.

Again, in case 20, there was given as the cause of death: "Reflex paralysis of the heart." If the Doctor will explain how chloroform can produce this "reflex paralysis of the heart," he will no doubt enlighten many who are anxious to know all about the direct and indirect effects of chloroform. While the Doctor, in his valuable paper is endeavoring to show that ether is much safer than chloroform, he admits that in the hot climates "it is more apt to produce suffocation than chloroform, which is given with much greater admixture of air." In these last few words here quoted the Doctor conveys, indirectly, more practical knowledge to the earnest student than is contained in all the report of the Hyderabad Commission, and in his own report besides this. Herein lies the danger to life. Suffocation, which means asphyxia or the deprivation of the proper oxygenation of the blood to sustain life; or by suddenly inducting an over percentage of any of these narcotic elements to produce, by chemical action on the tens of thousands of nerve filliments spread out over about 1,400 square feet of surface (as is estimated to be), in an ordinary sized man's lungs, produces paralysis of nerve centre by the first induction. But neither of these so-called anæsthetics can produce anæsthesia of themselves for the simple reason, that they are not anæsthetics in point of fact. It is *absolutely true* that there can be no anæsthetic without having in it sufficient free oxygen to supply in due quantity the red corpuscles of the blood to support combustion and sustain life. Chloroform, ether, nitrous oxyide gas, etc., do not contain this free oxygen. Hence they are not anæsthetics, no matter how much they may be so called. We must properly charge the atmospheric air with the narcotic (chloroform, ether, etc:,) and then the anæsthetic is made. The anæsthetic is then narcotized air, or chloroform narcotized air, etc. But if we charge the air with the narcotic to the extent of excluding the free oxygen that is absolutely essential to continuously support combustion and to sustain life, then we do not have an anæsthetic, but do unquestionably have an asphyxiating agent, and if continuously administered without any exception, we will have asphyxia and death with the use of either chloroform, ether or any other suitable narcotic; and in such case the lungs cease their functions first.

To show what may cause the heart to cease its functions first we may be allowed to introduce here an abstract from a lecture that I gave the State Dental Association of Indiana (and which may be found in the first volume of the Dental and Surgical Microcosm).

To produce anæsthesia, or insensibility to pain, you interrupt the neural circulation in the sensory nerves, which communicate from the periphery to the nerve centers. This may be done by either an internal or external agent. The internal agent is the intellect. The external agent is either chemical or mechanical. These two agencies each produce similar results. In producing anæsthesia you want to continue the current of nervo-vital fluid in the motor nerves leading to the organs of life, and interrupt it in the sensory nerves. That can be interrupted in surgical operations by these agents, either separately or jointly. If you anæsthetize the patient, you hypnotize the patient by your use of an external agent, but you may use it jointly with the internal agent.

Now, I want to show how to save life in producing anæsthesia, and how to do away with the usual unpleasant after-results of nausea. You will save life if you never produce paralysis of the nerve centers nor never produce asphyxia. Death must be preceded by the paralyzation of the nerve centers. I have shown that it can be produced by the action of the intellect, and it can be produced by an external agent. When you are administering an anæsthetic, it is an external agent, but you may have it by the action of the internal agent when you think you are producing it by an external agent. For instance, when a patient is under the impression that there is great danger connected with anæsthesia. He has read a great many death stories about it. He feels some of the manifestations of an anæsthetic; a pricking sensation in his fingers, numbness in the hands and knees, and creeping all over him a strange sensation. He imagines he is dying, he feels quite certain he is going. Now, I submit that if any of you were quite certain, here to-night, that you were dying and you were of a syncopic tendency, whether you might not go into syncope. There is the action of the intellect producing syncope, and if you have syncope and have partial narcosis, you have a very dangerous condition. There is where many persons meet death. You can prevent syncope by guarding against the manifestations and claiming the attention of the patient while you are anæsthetizing him.

Again, you may have death from the external agent that you are about to apply. As I said, the capacity of the atmosphere to take up at ninety degrees, is twice as much as at sixty degrees, or four times as much as at forty degrees. Now supposing it to be in the hot season of the year, and you administer all of a sudden 30 per cent. of the narcotic element, the chemical action causes concussion, and with one inhalation the functions of life may cease. A physician in Michigan on whom I called about three years ago, told me of an instance beautifully illustrating this. He told me he was positive that the lady only took one inhalation. So far as he knew she was healthy, but the functions of life ceased right there. I asked him, "what was the temperature?" "At least 85°." "Do you know what is the capacity of the atmosphere to take up and carry at 85°?" He had never thought of that. "Well, the capacity is about thirty per cent., and you let in thirty per cent. suddenly on the tens of thousands of nerve filaments spread out over that vast surface, in the lungs the chemical action produces concussion, revulsion and paralyzation."

If time would permit I could relate over a hundred illustrations of the same principle. If you never introduce suddenly an over percentage of your narcotic, and if you are using aerated chloroform as your anæsthetic, you commence with one per cent., and increase it gradually to two per cent., then three, and so on; you never can have the heart fail, as a consequence of your anæsthetic.

THE ASSISTANT EDITOR.

The readers of the DENTAL AND SURGICAL MICROCOSM will permit us to present one of our associate editors, Frederick Gaertner, A. M., M. D., of Pittsburgh, whose physiognomy may be seen in the frontispiece of this number, that they may have at least a partial personal acquaintance with the Doctor.

Doctor Gaertner was principally educated in Germany and is well and favorably known as a writer, having been a contributor to *The Arena* and other scientific and medical journals. He received the degrees of A. M., M. D., of the University of Strasburg, Germany; also, M. D. of St. Louis Medical College; A. B. of Mound City College, St. Louis, and a certificate of endorsement from the University of Pennsylvania. He is assigned to the department of the surgery and surgical pathology of the body, in cooperation with anæsthesia, and in this connection our readers will learn more of him through his vigorous pen.

SURGERY AND PATHOLOGY.

BY THE ASSOCIATE EDITOR.

Surgery and surgical pathology in their co-operative relation with anæsthesia and anæsthetics, has been divided off as a distinct science by the DENTAL AND SURGICAL MICROCOSM. This is surely a very broad field, and much remains for future investigations and observations. The value of anæsthetics properly applied in surgery is so great, and the results produced so vital, that I wish here to emphasize its practical application and utility, as strongly as possible. Without the aid of anæsthetics and anæsthesia, surgery and surgical pathology would yet be in its infancy, and to a certain extent, would have remained forever undeveloped. Think back only forty or fifty years, and imagine you are called upon to amputate a man's leg or arm without having an anæsthetic with you to properly anæsthise your patient? Straps and ropes you have quite sufficient, to hold and bandage down your patients upon a bench or an operating chair, and thus begin your amputation, what suffering and torturing your patient must have gone through. It is no wonder ninety-five per cent. of all such patients died.

Some of the more delicate and important surgical operations, such as those upon the spleen, liver, kidneys, lungs, stomach, bowels, etc., and the various plastic operations upon the muscles, nerves and bones, operations upon the eye, ear, nose and throat, were only first thoroughly developed and understood after the discovery and the practical application of anæsthetics.

This department will only be an exponent of modern science in its relation to surgery and surgical pathology. It will be the sole aim of its Editor to give the most liberal, progressive and impartial views, and papers of the boldest, ablest and most authoritative thinkers and surgeons of the whole world. In its discussions and demonstrations of the most scientific problems will strike at the very root of the question at issue, instead of wasting time on mere results or superficial aspects of the same. Its contributions will largely be from the world's greatest and boldest surgeons and pathologists. Hence, it will quote new discoveries, and discuss problems in advance of the journals who do not make a specialty of these sciences.

The Dental and Surgical Microcosm respectfully bows to its numerous readers in the dawn of A. D. 1892, wishing the compliments of the season. and to everyone a bright and prosperous professional career.

The Dental and Surgical Microcosm also extends her generous helping hand in all attempts to ascend the rugged steps of science, and especially those sciences to which she is chiefly devoted. She simply asks that the latch-string be raised, and that notice to that effect be served by filling out and signing the blank pasted in this number of the Dental and Surgical Microcosm, and sending it to the publisher, with the usual *tip* of $1.00, that she may continue to smile on you for one entire year.

Fearless, independent, aggressive—belonging to no school nor clique, but earnestly advocating and elevating the sciences—the Dental and Surgical Microcosm hopes to merit the favor and patronage of all who are in pursuit of true knowledge.

SPICE BOX.

A colored brother, although suffering with an aching tooth, attended the usual Friday evening meeting. Being called upon to lead in prayer, he proceeded as follows : "Oh, Lor,' bress dose"—when, in agony of pain, he exclaimed : "Brudder Thompsing, jiss you finish dat ere prayer while I wrastle wid de debbil in my mouff."

Brown—I'd have this infernal tooth out if I were sure it wouldn't hurt too much.

Mrs. Brown—Make up your mind, my dear, that you will feel just about as much pain as you do when you give me a little money to go shopping.

"He is rich," said her mother, "it is therefore absurd for you, Mabel, my dear, to say you cannot love him."

"But, mamma, his teeth are false, and so is his hair, and Lord knows what else."

"So are your father's teeth ; and his hair would be if he had any; but you love your father, don't you?"

This settled it. The more artificial the better, especially his money, for certainly that was not a natural production, it was acquired.

ETHICS AND ETHICAL MATTERS.

There is always a deal of philosophy in *The Dominion Dental Journal*, but sometimes one cannot exactly comprehend its application. In the September number, for instance, in the editorial, "Code of Ethics," (which may be found on page 186.—Ed.) we are puzzled to know for just what the editor is pleading. It would *appear* to be a justification of such associations as The Goodyear Dental Vulcanite Co., and The International Tooth Crown Co.; but surely that cannot be the aim of the writer. He says:

"When a dentist devises or discovers something which is generally recognized as valuable, and which his confreres are glad to obtain; when societies ask him and pay him to give clinics, and in spite of arrogant sneers he demonstrates its value, his effort merits open and fair encouragement."

Well, that depends upon what those efforts are. Dental societies sometimes exhibit quite as unprofessional and quackish a spirit as could any single practitioner. A society is very apt to be but the reflection of some ruling spirit within it, and the fact that it invites a man to give a clinic before it proves nothing. That, perhaps, has been brought about through some convenient friend of the one who desires an opportunity to exhibit something that he has for sale. Societies are very frequently "worked" in this way, and in a manner that is little to their credit.

The "encouragement" that a demonstrator merits depends largely upon the methods he employs. Societies are supposed to be instituted for the benefit of dentistry, and to stimulate a professional spirit. If the methods of the proposed clinician tend to this, he should be given all the encouragement possible. If they do not, the only encouragement offered should be a frigid scapula. If especially, as in many instances, the proposed operator is living in open violation of all professional ties and obligations, if he is a notorious advertiser and an offensive opponent of all the ethics usually accepted among reputable dentists, and which it is the duty of dental societies to support, the encouragement offered should be with a club.

The patent question has not necessarily anything to do with the question of ethics. There is nothing essentially unprofessional in the taking out of a patent. Did anyone ever criticise the late Dr. Edward Maynard for patenting his invention of the breech-loading rifle, which revolutionized the manufacture of fire-arms? But if Dr. Maynard had patented some process in filling teeth, the essential principles of which were as old as dentistry, and had then, under cover of our systemless code of patent laws, sought to establish an odious method of office license, with all its detestable espionage and its execrable fostering of an unprofessional, exclusive, jealous spirit among dentists, does anyone think that Dr. Maynard's name would be justly held in such honor as it is to-day?

You see there are patents, and then again there are patents. There are those which honorably protect an original discovery, and there are those which are but thievery under another name.

The Dominion Dental Journal is unfortunate in its illustrations. There is not much in common between Doctors Barnum and Land. The one discovered a most useful adaptation of an already well known article. There was really no invention about it. It was a novel use for an old invention, but it was pregnant with the greatest good to dentistry. With true professional spirit he gave it to his brethren, and probably received from a grateful profession more than he could have obtained in any other way. While of very wide adaptability, his discovery was not one from which much money would have been the net result. He could not have controlled the manufacture of rubber, for that was a monopoly already established by others, while the collection of royalties for the use of a previously manufactured article is attended with too many difficulties to be pecuniarily profitable. Certainly he has been made immensely rich in the good will of his compeers. There are many things worth striving for besides money, such as "honor, love, obedience, troops of friends," though many men seem but too ready to sacrifice all these for a few dirty dollars.

The other person used as an exemplar has shown no sympathy with the spirit exhibited by Dr. Barnum, and believes that the latter should have "milked" the profession for all that it was worth. His own views are those of the spirit of trade, and his devices are bunched together into a kind of system of patent dentistry, for the practice of which office licenses are or have been issued, upon the principle of the Goodyear Dental Vulcanite Co., and the International Tooth Crown Co.

This he has a perfect legal right to do, but what about the ethical standing of societies which encourage that kind of thing? Shall we abolish the code entirely? Is there not room for an honest difference of opinion with the men who would do this?

We are always instructed by reading *The Dominion Dental Journal*, the more so when we can antagonize its views, for then it leads one to reflection. The man who proposes to deny the conclusions of its editor needs to have his wits about him, and to study his ground thoroughly. *The Journal* is a great provocative of thought, hence this article.—*The Dental Advertiser.*

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*See criticism of D. & S. Microcosm on page 197.

DEATH FROM NITROUS OXIDE GAS, OR SO CALLED "VITALIZED AIR."

Bernard Mohan, a glassblower, aged 31, died in the dental chair of Dr. W. S. Yates yesterday afternoon. His death, according to the post mortem examination, was due to exhaustion while under the influence of "vitalized air." It was also shown that Mohan was in good health previous to taking the anæsthetic, and that his organs were all normal and in good condition. Coroner McDowell will hold an inquest to-day and make a thorough examination. No arrests have yet been made.

Mohan was a strong, robust fellow, who weighed 202 pounds and had always been in good health. His home was on Smallman street between Twenty-eighth and Twenty-ninth. He was married and leaves a wife, but no children. On Tuesday he went to Dr. Yates to have the root of a tooth extracted. The operation would require the gums to be cut deeply, so he took "vitalized air." When under its influence he could not be restrained. Dr. Yates tried to hold him in the chair so that he could work, but failed and postponed the operation.

Yesterday, Mr. Mohan returned with three friends to keep him quiet while under the influence of the "vitalized air." They held him for a short time, and then he seemed to fall asleep. The doctor took the tooth out, and attempted to resuscitate his patient, but could not. It was found that his heart was beating but feebly, and Drs. Gentry and Dickson were sent for. They brought into use all means known to medical science to bring back life, but everything failed. A battery applied to the man's heart kept up the feeble beating for a short time, but finally that failed, and an hour and a half after the physicians had been summoned the man was pronounced dead.

A post mortem examination was held later in the day by Dr. McCandless, Dr. Gentry and Dr. Koenig. They failed to discover any organic trouble that could have caused death, and stated that the cause must have been from the anæsthetic. Dr. Yates was present. He claimed he had administered only the usual amount of "vitalized air," and knew no reason for the death. He will be present at the inquest to day, and would say nothing further until that time.—*Pittsburg Dispatch*, Dec. 30, 1891.

CHIP BASKET.

QUESTION 25. (*1.*) *To how young a child is it safe to administer gas?*

(*2.*) *Have you ever used Steinau's local anæsthetic, and if so, with what success?*

(1.) I have never used gas with children under twelve years of age.

(2.) No. *C. L. Boyd.*

(1.) I never administer gas to a child under ten years of age.

(2.) No. *L. B. Archer.*

(1.) I think it would be as safe to administer gas to a young child as to an older patient, but the sight of inhaler so frightens them, and the face is usually so small, I have not found it a practical anæsthetic for children.

(2.) I have seen Steinau's local anæsthetic used, and have also *felt* it used, so I can speak from experience. The first insertion of needle, on both lingual and buccal surfaces, was painful; in fact, I think as much so as if tooth had been extracted without an anæsthetic. The first injection numbed the gum, so the remaining ones were practially painless. The application of the forceps was attended with but little pain, but the wrenching was as painful as though nothing had been used. I think extraction under any local anæsthetic, used with a hypodermic syringe, hurts the patient as much, but in a roundabout way, and by degrees, so they think the actual pain diminished.—*Items of Interest.* *C. H. Haines.*

THE

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CHLOROFORM, THE BEST OF ANÆSTHETICS.

BY PROF. JULIAN J. CHISOLM, M. D.

(Continued from No. 3.)

The *fifth cause* of death from both chloroform and ether, probably the most common of all, has been more frequent of late years, being rendered so by the unsettling of the former confidence which surgeons have had in the safety of anæsthetics. In their present timidity, surgeons do not now push the inhalation to the degree of suspending the functions of such parts of the cerebro-spinal system as preside over the emotional, sensational, motor and reflex acts; the only condition recognized as one of perfect safety in chloroform and other anæsthesia. I refer to that condition in which peripheral irritation can no longer be transmitted through the cord to the brain, and then back, by the vagus and pneumogastric nerves, to the cardiac ganglia. Any condition short of this stage of temporary suspension of reflex agencies leaves the heart exposed to those serious inroads from peripherial irritation through which its movements may be suddenly and permanently arrested. Such fatal results are indentical with instances of nervous shock, so familiar to operators in former times, before the discovery of anæsthetics, and then deemed a sufficient explanation of death under the circumstances. In this way can be satisfactorally classified the many deaths under anæsthetics for trival operations, as tooth drawing, opening of abscesses, etc.,when only enough of the agent was inhaled in the sitting posture to partially stupefy, but not to protect against reflex accidents from emotional or peripheral excitement. When a patient who has been under an anæsthetic during a painful operation, utters a scream and then stops breathing, although the death may be called one of fatal anæsthetic narcosis, the true state of the case is, *not enough of the anæsthetic* to protect the heart from reflex influences. Many such cases are reported under the heading "death from chloroform." The heading ought to be "death for want of more chloroform."

In this class are placed those many fatal cases during the more serious operations, in which the timidity or anxiety of the surgeon, with unsettled confidence in the article he is using, induces him to arrest the inhalation before the period of safety has been reached, or not continuing the administration so as to keep up the protection during the final painful steps while completing the operation. He commences the cutting operation with the vital organs all exposed to injurious reflex peripheral irritation, and under the cloak of the anæsthetic, without its protection, invites disaster. Hence it is that an operator, who has once been frightened during an insufficient administration of anæsthetics; continues to have accidents which do not occur to others, who, never having seen trouble, administer the drug boldly. Timidity here must be classified with ignorance, both being dangerous negative qualifications for successful surgery. When deaths occur under these circumstances, the fatal result is not to be attributed to the anæsthetic, but, on the contrary, to the want of a sufficient amount of it—clearly a defective administration, induced by unwarrantable and unworthy fright on the part of the operator.

Under this heading I would also class the deaths said to be occasioned by heart diseases under the inhalation of chloroform. Richardson, of London, after a critical examination of the various diseased conditions of the body, said to be hostile to the administration of chloroform, and especially after maturely considering the many varieties of heart disease, including valvular growths, vascular contractions, cardiac hypertrophies, stenosis of heart orifices, and in fact the entire list of heart troubles, sums up his experimental observations with the following remarks: "On the whole, the only diseased condition which I could give as a warning to practitioners from exceptional danger in the administration of chloroform is the diagnostic of a dilated and weak right heart." And then states that in one such case he had forewarned the surgeon, who then gave chloroform and had a fatal result. But what guarantee have we that the patient with such a heart would not have succumbed to the operation itself, without having inhaled an anæsthetic? These heart conditions are so prone to syncope that anæsthetics are needed during painful operations to prevent the fatal emotional shock, so prone to arise from reflex irritations. In such cases we recognize the necessity for a cardiac stimulus, whiskey and a cardiac sedative, hypodermic of morphia, which will prevent the fatal depression.

Diseased conditions of the heart, regardless of kind, may make this important organ peculiarly susceptible to syncopetic influences, when reflex action has full sway; hence we find violent emotional excitement a fruitful cause for mortality in the subjects of heart disease. Many such persons having to undergo painful surgical operations in former times, before the introduction of chloroform, suddenly collapsed with the first incision; and they still die as of old when they are not properly protected by complete anæsthesia. Should chloroform be freely given to patients with heart disease, regardless of kind, who must submit to painful operations for the cure of some surgical affection, by its liberal use they are put in a condition of safety against all emotional and reflex annoyances, without which they could not escape trouble.

I look upon chloroform as the strong bridge which will conduct patients suffering from serious heart disease safely over serious operations. As a surgeon in large ophthalmic practice, I frequently am compelled to perform the most delicate and painful operations upon the eyes of timid patients suffering from heart disease in some one of its various forms. Cataracts occurring usually at an advanced age, most frequently between 60 and 85 years of age, are often associated with organic diseases of the heart in patients enfeebled by senility. Prior to the introduction of cocaine, that wonderful local anæsthetic for eye work, I never refused to give such patients chloroform; on the contrary, I urged its use. The only difference that I made in such cases over other patients was by exercising even more care in establishing the safe stage of complete anæsthesia through the liberal use of the drug. Kidney diseases are referred to as a very dangerous element to the anæsthetized with sulphuric ether, and many operators examine with care the urine of patients prior to administering ether as an anæsthetic. Bronchial troubles are also considered antagonistic to the safe administration of sulphuric ether, not directly, but indirectly. In such cases, after the operation has been completed and the resuscitated patient has been put to bed, a fatal pneumonia has developed, which follows too often the administration of ether to be considered a mere coincidence. This fatal pneumonia has not been noticed as a sequel of chloroform anæsthesia. Using chloroform exclusively, I have never thought it necessrry to examine the urine nor the chest for lung diseases, and have had no occasion to regret my seeming neglect in this connection. From the standpoint of my own personal experience, I know of no organic lesion which contra-indicates the careful and thorough administration of chloroform.

The *sixth cause* of death during the administration of ether or chloroform, is from excessive administration. No one can doubt for a moment that chloroform and ether possess toxic action, and that in common with all other active agents in medicine, the danger is dependent upon the size of the dose used. The dose of an anæsthetic can easily be made large enough to kill by enfeebling, and finally paralyzing the nerve centres from which the heart and lungs draw their inspiration. This class of remedies are clearly cumulative, and when enough has been inhaled to cause the suspension of voluntary motion, sensation and reflex action, if their administration be continued, instead of being suspended, an amount can be concentrated in the circulation quite sufficient to stop respiration and the heart's action.

As I have said before, there is usually a broad gulf between that degree of anæsthesia which only suspends so much of cerebral action as still allows full play to the vital organs—a perfectly safe condition for surgical operations—and that fatal overdose of the anæsthetic from which there is a suppression of the cardiac and respiratory centres for innervation. Surgeons often employ ignorant assistants to administer the anæsthetic, who conceive it to be their duty to keep the saturated cloth to the nose of the patient, and they know no stopping point. They are told to give the ether, and they do it, showing neither judgment nor discretion in the administration. Unless watched by the surgeon, whose attention should be concentrated elsewhere, they go on applying the vapor, notwithstanding complete narcotism has been secured. Fortunately, the elimination of the lethal vapor from the blood through the lungs is so rapid that by removing the towel a very few expirations will reduce the amount in the system to a safe standard and dissipate the threatened danger.

Cases will occur now and then, fortunately at long intervals, in which, under an anæsthetic, there is a sudden weakening of the heart's action, accompanied by a death-like palor of the face and a very feeble respiration. I have had cases in my personal experience in which, under chloroform, breathing suddenly stopped with the disappearance of the pulse at the wrist. The patient looked like a corpse and was apparently dead. From even this very alarming condition the vital function can be still re-established by promptly inverting the patient, hanging him up by the feet with head down, so as to allow blood to gravitate toward the anæmic brain.

When a piece of the skull of an animal is removed so as to expose the brain, and chloroform is then administered, the vessels are seen to shrink in volume, the surface bleaching as narcotism advances. These experiments show that chloroform produces an anæmic condition of the brain, and that the various phenomena observed during the administration of an anæsthetic, are in a measure caused by the diminished blood supply to the various nerve centres. Nelaton's experiments with rats gave to the surgical world that admirable method for restoring strength to the enfeebled heart by hanging the patient up by the feet. He found that when rats were thoroughly chloroformed, if immediately hung up by the tail they would revive; if left lying on the table, they died. It is a mooted point whether the resusitation is brought about by an additional supply of blood to the anæmic brain alone, or by the emptying of the blood from the great reservoir, the liver, through the vena cava into the cavities of the heart, stimulating them into renewed activity. Most likely both of these influences work. Certain it is that when the lungs and heart fail under anæsthesia, the immediate suspension of the patient, with head down, will re-establish lung and heart action, provided no time has been lost between the arrest of breathing and the inversion of the patient.

When, during the administration of an anæsthetic, breathing stops, the great danger to the patient is in the recumbent posture. The chief reason why remedies used for resuscitation fail is because they are applied to the inanimate body when lying flat on the bed or table. Water splashing, spanking the surface to excite reflex action, hypodermics of whiskey, artificial respiration, electricity—all of them unfortunately usually go for nothing, as the various reports of deaths during the use of anæsthetics show.

In my own cases of suspended animation, four in number, my patients looked dead, and would have died had I not promptly, and without one instant's delay, hung them up by the feet. In one case, when I laid him down too soon, he breathing again stopped, necessitating the immediate resumption of the inversion, and this was repeated three times before the respiration became permanently reestablished. In each of the four cases I depended upon inversion alone to bring back the pulse. After a few minutes of suspension I was gratified in seeing respiration and heart's action reestablished, and my patients were saved. These would have been among the so-called deaths from chloroform, had I lost precious time in making the usual applications of cold water to the face, hypodermics of whiskey, or even in practicing artificial respiration with the patient lying on the operation table. Do all of these things if you will, but in my opinion always hang up the patient first.

When under an anæsthetic the respiration suddenly stops and the pulse disappears, the patient is rapidly dying, but is not yet dead. Hang him up immediately, with head down, and he will not die. Leave him supine while you apply the remedies recommended in books on surgery, after a very short interval death, the end of mundane life, will have taken place. Time now bestowed in trying to bring back the dead to life, is wasted energy. How often do we read of the herculean efforts of the doctors, using every known remedy (except the efficient one of inversion of the patient) and keeping up the work for hours, but all to no purpose. When, through an overdose of chloroform or ether, the vital functions are suspended and the patient dies, the death should be put to its proper cause—want of knowledge or lack of activity on the part of the surgeon in applying the proper remedy. Another clear case of mal administration.

The *seventh*, the only legitimate and rarest of all causes of death from anæsthetics, now faces us. It is that unknown condition called idiosyncrasy, in which anæsthetics show themselves poison of extreme activity, and at some stage of the administration kills promptly. Patients who carry about with them this innate fatality exhibit it by no recognized signs. When such persons die from the toxic inhalation, the autopsy reveals absolutely nothing to indicate the destructive effects of the poison.

The effects of anæsthetics depend on the immediate influences exerted by the drug upon the sensitive elements of the nerve centres, in virtue of which their properties are temporarily suspended. In cases of idiosyncrasy, these functions, so essential to life, become permanently suppressed. With the death of the individual, the changes in these nerve elements are of such a nature that, so far, they have altogether escaped detection by pathological investigators.

We call the practice of medicine empirical, because every dose of medicine we administer to a patient for the first time is more or less an experiment. We cannot in advance say that because a drug is expected to act in a previously established way it will do so in the case before us. The every-day experience of physicians teaches them not to be surprised if now and then they should obtain from drugs diametrically opposite results from those looked for ; and very often intensity of action not at all commensurate with the very small dose administered. I have known opium to produce intense pain ; it is the common remedy to allay it. I have known Dover's powder to purge violently ; it is a common remedy for checking diarrhœa. I have known a single grain of quinine to produce desquamation of the cuticle; a grain of the iodide of potassium to bring on a most distressing coryza, and a grain of calomel to excite the most profuse ptyalism. On one occasion in an old lady under my care, one single drop of tincture of aconite brought on prostration that nearly proved fatal. How often a single moderate dose of the narcotics in constant use has put the patient under the sod, the grave alone can tell. To the world, the death is always attributed to the disease for which the dose has often been judiciously but now fatally prescribed. The administration of the remedy was based upon the great good that it had accomplished in controlling these very symptoms in thousands of cases. The idiosyncrasy of the individual in these special instances was the immediate cause of the fatal issue , a condition which could not have been foreseen, and therefore no precautions could have guarded the physician against it. In these cases, which can not be very rare, from the variety and number of potent drugs used by practitioners, the fatality following the dose administered is often not recognized, even by the medical attendant. The patient died, after taking the medicine, when the symptoms of the disease had not indicated so serious or so sudden a result. The reason why the fatal issue came about, most physicians do not wish to consider.

From the exclusive use of any one potent remedy the idiosyncrasy must be rare, so that in taking one, say opium, a powerful drug most extensively used by every physician, and applicable to most of the diseases to which the human subject is liable, pecularities in constitution, exhibiting dangerous symptoms from comparatively small doses, are only now and then met with. When we contrast, as to frequency, cases requiring serious surgical operations, against the many little and great disturbances of the various organs of the living economy brought to the notice of the physician and requiring the use of opium, we find the surgical cases in the ratio of scarcely one to a thousand. Now take such a remedy as chloroform, only used by surgeons in these serious surgical cases, and hunt up idiosyncracies for this drug. Their occurance must be so very rare that a surgeon of very large experience is not likely to see more than one fatal case in a long life devoted to surgical practice; and a great many surgeons of very large experience have never met with one. Syme, whose surgical career in Edinburg is known to every one in the profession, was so uniformly successful with anæsthetics, never having lost a patient from the inhalation, that he adopted this axiom, "Show me a case for operation, and I will show you a case for chloroform." At the Edinburg Infirmary, during a period of 28 years from the introduction of chloriform into surgical practice, only two deaths had been attributed to chloroform, which, according to Ker, is one death in 36,500 administractors. Grant, in his admirable Treatise on Surgery, says: "I have seen chloroform given in some thousands of cases during upward of twenty years, both in hospital and private practice, without a single death, or even an approach to a fatal termination." Elser, of Strasburg, has used chloroform 16,000 times, and had never seen a fatal case. Kidd, of London, had seen it administered upward of 10,000 times, and had seen no fatal case, either in his own practice or that of his friends. Dr. Bardeleben, of Berlin, had participated in its administration to over 30,000 patients before meeting with a death from chloroform. The French surgeons in the Crimea reported 30,000 cases of chloroform administered and not one fatal issue. In the English army in the Crimea chloroform was administered 12,000 times with one single death reported as attributed to it. In the Confederate service chloroform was exclusively used in a great many thousand operations without a death, as far as I am aware of, or have been able to ascertain, after diligent inquiry among leading surgeons of the army. Surgeon McGuire, of Jackson's corps, reported 28,000 administrations without one death. Richardson had seen it used in the London hospitals 15,000 times before he met with the first fatal case. Billroth, of Vienna, had administered chloroform 12,500 times before he met with his first accident. Clover has recorded 3,000 administrations without a single death. Erichsen has only witnessed one single death under chloroform in 25 years at the University Hospital. In the Medical and Surgical History of the war of the Rebellion, published in 1883, in the ar ticle anæsthetics, mention is made that in the Federal army chloroform was almost exclusively used in field operations. "The returns indicate that it was administered in no less than 80,000 cases. In 37 cases fatal results had been ascribed to its use," a proportion of one death in 2,200 administrations. The 37 cases in which a fatal issue followed are given in detail with the following comment:

"Considering the great number of cases in which chloroform was applied principally during and after the exciting circumstances of a battle when expedition was a matter of necessity, it is remarkable that not more cases of death from this agent have been recorded. With what justice the fatal issue in these cases here cited are chargeable to the anæsthetic the reader must judge for himself."

To the testimony above I will add my own individual experience. I have been practising surgery thirty-five years, and have used chloroform largely during that entire period in private and hospital practice, in the army as well as in civil life, and have administered it to the extent of fully 10,000 cases from chloroform and fully 3,000 anæsthesias from the bromide of ethyl, fully 13,000 cases in all, and without a death. For some years I have administered it on an average of at least once every day. I have given it to the very young and to the very old; to the very strong as well as to the very weak; to the healthy as well as to the extremely diseased—regardless of the organ in which the trouble may be located. I have seen patients thoroughly anæsthetized by a half drachm of chloroform, and I have seen a pound bottle wasted upon a sailor in keeping up full norcotism for a long period, and I have had occasion to keep up the anæsthesia as long as two hours at a time. I have accepted Syme's axiom and given chloroform to every one, regardless of visceral complications, who has applied to me for a serious surgical operation, and I have yet to see the first death either in my own practice or that of my friends.

Now let us sum up the evidence which I have collected, and here we find an array of *over 300,000 administrations of chloroform with 43 deaths*, even attributing them all to idiosyncracy, which calls for a most unbounded charity, and we only have one death in 7,000 cases. Can any stronger proof of the excessive rarity of the fatal idiosyncrasy in chloroform be needed.

Omitting army statistics as more or less unreliable, especially when taking into consideration the conditions of excitement, confusion, hurry, carelessness, necessarily pertaining to such times and circumstances, if we take only the authentic reports of well-known surgeons in civil practice, surrounded by those facilities for a careful and thorough administration which are so readily secured in modern hospitals and in the large cities, we can obtain a very fair estimate of what ought to befall a careful surgeon who uses chloroform. These are called rare instances of success, and that the experience of these well-known surgeons should not be accepted as the true percentage of chloroform fatalities. Grant it. Still the truthfulness of these hospital reports and individual experiences, as given above, are not questioned. What one surgeon has accomplished, throughout a long life of active practice, another should surely be able to duplicate; and if any one surgeon has given chloroform 30,000 times without a fatal issue, this should become the standard for its proper administration.

I believe that deaths with ether, during its careful and full administration, are equally rare. In America, where ether was discovered and has been most used, especially by the Boston, New York and Philadelphia surgeons (for its administration seems to be chiefly confined to the Northern cities), we may find surgeons like those above mentioned who have records of thousands of cases without a single fatal issue. And yet, in proof that neither anæsthetic is absolutely safe, deaths, however rare they may be, do sometimes occur during the administration of both ether and chloroform, even when the purest article has been used and every care bestowed in the inhalation. That accidents come much more frequently to some surgeons than to others is a matter of ever-day observation. No one attributes accidents to his own want of care or want of knowledge, and yet a well-informed observer can sometimes readily trace the cause of trouble in the cases of others. We see this constantly in the detailed accounts of the published reports of deaths attributed to anæsthetics. One surgeon, with a moderate practice, has lost by death two or more patients to whom he had administered an anæsthetic. Another surgeon, in large practice, has never lost a patient, although giving chloroform daily at hospital clinics. What should be the inference?

Dr. J. B. Roberts, of Philadelphia, in a paper on ether deaths, published in the *Philadelphia Medical Times*, says: "It has been my fortune on four occassions to witness the occurrence of death during or immediately after the production of anæsthesia. In three of these instances sulphuric ether was employed and in the other the bromide of ethyl. On numerous other occassions I have seen patients almost die from the effects of chloroform or other anæsthetics, who were fortunately revived by well-directed treatment." Truly a frightful experience, and in a city where chloroform is denounced. I know of no one who has ever seen as many deaths from chloroform. I know a physician who in his early professional life administered chloroform to a patient and the patient died. His alarm was so great at the result of his administration that he has never used chloroform since. His mortality from chloroform therefore remains 100 per cent. He was one of the very unfortunates. Some surgeons seem to have been unlucky enough to have had a great deal more trouble with anæsthetics than should have fallen to the share of one administrator. I, for one, do not believe in lucky and unlucky surgeons. I believe, with Napoleon, that luck usually accompanies the best organized battalions.

Against the fatality of idiosyncrasies, we can hardly guard, and yet something even here might be done. Three are four times in my own experience I have had cases in which I at the the time thought that the anæsthetic which I was administering was badly borne. Once while giving chloroform, in my early professional life, I noticed a sudden and unusual pallor. I stopped the administration, and the patient, by breathing pure air, soon assumed a natural appearance. I resumed the chloroform with similar results. I then exchanged it for ether, and had no further appearance of these symptoms. What might have occurred, had I continued the chloroform, I am unable to say, possibly nothing but the most satisfactory anæsthesia. It might have been a groundless fright, still I am willing to call it an idiosyncrasy. In a second case, a young girl of seventeen, to whom I had given no stimulus, I thought that the pulse was rapidly enfeebled by the chloroform inhalation, and I exchanged the anæsthetic for ether. In one or two instances, some years ago, when administering ether, I thought the anæsthetic badly borne, causing intense congestion of the head or excessive irritation of the throat. In these cases I stopped the ether and administered chloroform, with, as I conceived marked relief. My fears again may have been altogether groundless, as in the chloroform cases before metioned.

I constantly see cases which excite the most anxious solicitude on the part of the timid and inexperienced operators—a marked enfeebling of the pulse, feeble respiration, pallor of the face, and relaxation of the skin, with prespiration pouring out upon the surface. Experience has taught me that this relaxed condition, which so many are terribly alarmed about, is only the precursor of vomiting, and is the signal that I must prepare the patient for emesis. This condition, so constantly met with by the every-day administrator of chloroform, has so frightened many an inexperienced or timid operator as to make him believe that he had come within an ace of having on his hand a fatal case from inhalation.

When one uses chloroform or ether in the way as explained, he might confidently expect no trouble. Should he believe that chloroform always weakens the heart's action, in anticipation he puts the best of cardiac stimulants, a drink of whiskey, into the stomach of the patient, where it is ready for use if wanted, and can do no harm if it is not required. I attribute the uniform success of chloroform inhalation, in the hurry and confusion of battle field surgery, to this invaluable combination of whiskey with chloroform, and this in the face of the fact that as the Government purchases from the lowest bidder, army supplies are never of the best, and in times of war, with heavy demands, army medical supplies are very far from being chemically pure

Suppose, however, that from the tediousness of the operation or otherwise there should be a very marked enfeebling of the heart's action, the course to be pursued from the stand-point of my own experience is very simple. Every one has observed the suddenness with which the anæsthetic effect is diminished with the act of vomiting, with its accompanying congestion of the head. When there is no longer the anæsthetic to the nose of the patient, as every expiration is getting rid of a certain amount of chloroform vapor from the circulation, the admission of fresh air would naturally suggest itself. If the respiration and heart's action be detected, however feebly, ample experience shows that fresh air and an inclined position with head downwards is all that is wanted for a reestablishment of the vital functions. Death, which ought not to occur under this condition, may often with truth be attributed to the too much manipulation of the frightened attendants. Electricity may help the cardiac and respiratory effort should it be properly applied. According to Richardson's experience and observation, it is most frequently the name of electricity application only. In by far the majority of cases it does more harm than good. If not scientifically applied, and very few who administer anæsthetics know how to apply electricity to excite the cardiac and respiratory functions, it will insure the killing by permanently stopping both heart and lung action.

In those most rare but truly unfortunate cases in which the heart stops beating and remains for only a very few minutes the patient is dead absolutely, and nothing that the surgeon can do will restore him to life. The surgeon, unwilling to acknowledge his utter helplessness, keeps up the much doing of many things, for many minutes or hours, but all to no avail. These fatal cases should be only the very rare ones of idiosyncrasy, which we may hear much of, but may never see; and yet they may occur to the most careful. The majority of deaths ascribed to chloroform, properly should be attributed to mal-administration ; a fruitful source of trouble being that timidity of surgeons which will not allow them to safely anæsthetize patients, but induces them to operate before a sufficient amount of the anæsthetic is administered to protect against the dangers of reflex action. I truly believe that a great many more cases of death under chloroform are to be attributed to the want of it than to an overdose, which comes only next in rarity to deaths by idiosyncracy ; and that the timidity of the surgeon and not the chloroform swells the mortuary list.

When persons suddenly die on the street or at their homes, the coroner is ever ready with his convenient verdict of heart disease, when most frequently the heart is a perfectly healthy organ, and has been altogether innocently accused. If in any case an anæsthetic has been used, and a fatal accident occurs, death is immediately ascribed to the inhalation, when in reality it is due to other causes altogether extraneous to the administration. Notwithstanding this gross error in diagnosis, the reported death has its disturbing influence upon the profession; and when frequently reproduced in the daily papers will frighten the masses.

As chloroform has been up to within a few years the anæsthetic in nearly exclusive use in most parts of the world, very naturally a great many more deaths have been attributed to it than to the much less used ether. With its increased use, deaths from ether are now accumulating. Could rigorous statistical accounts be obtained, it would be found that ether, in proportion to the comparably small number of inhalations, would relatively exhibit as many deaths as chloroform.

Up to within a few years surgeons at large, have had every confidence in chloroform, and language was not strong enough to express their unbounded admiration. Professional confidence has been disturbed by the much talked-of toxic effects of chloroform, which has frightened the public and excited the timid in the profession. Many have imbibed the infection, not knowing why, and have taken to ether, an anæsthetic which has not had the opportunity of having as many deaths attributed to its administration. I also, some years since, under the pressure of public opinion, or rather the timidity of patients who expressed a preference for it, took up ether and gave it largely. For a short time I used nothing else, but its administration proved unsatisfactory, on account of the distress occasioned by its forced inhalation in a concentrated form, its offensive odor, the large amount required, the excessive throat and buccal secretions, and the irritable cough often excited. As we have all so often done with new remedies, relinquish them after a short trial to fall back to the older ones which had previously been our reliance, so I found myself soon getting back to chloroform, which I now exclusively use with all the confidence that so useful an agent ought to secure.

Believing, as I do, that both ether and chloroform can kill, when carelessly, indifferently or excessively administered—believing, also, that either of them will kill when the idiosyncrasy is met with in which its usual benign effects become toxic, and that these two remedies will do so in equal ratio to the number of times in which they are inhaled, I naturally confide in the one which experience has taught me to be equally safe, more agreeable, less nauseating, and more efficient. My acquaintance with chloroform has been of the most satisfactory kind. I have seen it administered at least ten thousand times, and I have never seen fatal trouble from it.

Since my attention has been turned to the decided advantages of chloroform over the less efficient sulphuric ether, I have often asked surgeons from a distance, with whom I may have been casually thrown, what anæsthetic they use. I find many say chloroform exclusively, from which they had never had an accident, and in which they have unbounded confidence. Others tell me that they administer ether; not that they ever had trouble with chloroform, but that they had been made somewhat timid by reading reports of fatal cases. They at the same time acknowledge that they do not obtain that satisfactory anæsthesia such as they formerly secured under chloroform; and that even now, when they find that their patient is not properly influenced with the ether, they pour on the chloroform, feeling that they can look confidently forward to a speedy and thorough anæsthesia.

Believing, as I do, that ether and chloroform will not prove dangerous if a pure drug is selected and carefuly administered, except in those extremely rare cases of idiosyncrasy, when both will prove toxic in like proportion, then in the comfort of the administration, both to the patient and surgeon, ether, in my opinion, is not to be compared to chloroform as a general anæsthetic, and can never take the place of the latter. The wave of professional opinion is moving back toward a returning confidence in the safety of chloroform, which many surgeons who administer it continually have never had shaken.

There is no remedy really good in medicine which is not capable of mischief. More persons are killed each year from the abuses of opium than have been attributed to chloroform from its discovery even to the present time. Deaths annually from opium in England alone are numbered by the hundreds. How many thousands are to be added to this list occurring under the careful administration of skilled physicians, we can easily conjecture. Yet who proposes to substitute for this king of drugs any of the milder narcotics? We are ready to accept the comparatively small fatality for the immense good it accomplishes. How often during the summer do we find in the daily papers reports of healthy persons dying suddenly from the too liberal potation of ice water, yet who would listen with any patience to the so-called philanthropist who would wage war against this universal beverage? It has been stated that more persons are killed by slipping on fragments of orange peel in the streets of London than from the inhalation of chloroform. No one suggests the destruction of orange groves on this account. No one finds fault with the laws of gravitation because persons continue to fall down and break their legs or necks. It is unfortunate for the individual, but the great laws of Nature must ever go on, and the great designs of the Creator enjoyed with wonder and astonishment. Shall we give up the use of horses or steam because accidents happen from both? Would we have all the rivers dried up because now and then a drowned man is fished up out of them? The great discoveries are for the good of the many—not for the few. You can not avoid every danger and at the same time enjoy every good.

With the careful administration of anæsthetics, the little risk, infinitesimally small, is immensely counterbalanced by the protection from the very many dangers during operations, so well known and so often experienced when operations were performed without them. Chloroform, when judiciously used, is one of the safest active remedies of the materia medica, supplying nearly every good and avoiding nearly every danger.

☞See Editorial Criticism, Page 260.

FOR THE DENTAL & SURGICAL MICROCOSM.

THE RESECTION OF THE INFERIOR MAXILLARY NERVE FOR FACIAL NEURALGIA.

BY PROF. JAMES E. GARRETSON, A. M., M. D., D. D. S.

Saturday, January 23, 1892.

The patient a lady of sixty-one years of age, being etherized the sigmoid notch was located by taxis and incisions made through the skin, superficial and deep facias, and masseter muscle forming an oval flap. The ramus of the inferior maxilla, was exposed with only the wounding of the transverse facial vein. A new operation (suggested by Dr. W. H. Cryer) was tried, it consisting of a series of holes being drilled through the bone and the connecting of them by means of a large burr. The nerve was then found and drawn up with a tenaculum, and traced to the foramen oveli, at which joint it was severed. When all the nerve possible (about ½ inch) had been drawn from the inferior dental canal it was also cut off. The debris of bone, etc. carefully washed out with a solution of phenol sodique, which agent was used to check the slight hemorrhage. Drainage was secured by a rope of cotton saturated with phenol, placed over the wound and kept in place by a Barton's bandage. The patient is doing well, most of the wound healing by first intention.

THE MICROSCOPE THE PRINCIPAL FACTOR IN DISCRIMINATING MEDICAL, MEDICO-LEGAL AND LEGAL COMPLICATIONS.

BY FREDERICK GAERTNER, A. M., M. D., PITTSBURGH, PA.

Since the introduction of microscopy as a study and a method of examination and research, and especially since its application in medical, medico-legal and legal difficulties, "science may be considered complete."

A scientist who has not mastered microscopy in all its details, is certainly incompetent and unreliable in his examinations. The competency and reliability of the scientist, are of especial importance when expert testimony is required at court, where the life of a fellow-citizen, may be involved in cases of indictment for murder, rape, infanticide, criminal abortion. This reliability is of scarcely less importance in cases of malpractice suits, suits for damages, cases of forgery, the adulteration of food and drink, the mutilation of legal documents, etc. This testimony may establish the genuineness of legal documents and discover counterfeit currency. All similar secret criminalities can be revealed and indubitably established by the agency of that wonderful instrument, the microscope. Until about ten to fifteen years ago the commonwealth, in prosecution of criminals, especially in cases of murder, would select and subpœna the best medical experts, who would give their experience and observation under similar circumstances. Now, the commonwealth ignores such testimony, and seeks the most learned scientist, *i. e.*, an expert microscopist, and bids him make a thorough scientific investigation, including microscopical, micro-chemical and chemical examinations of the subject before him. His testimony is then given before an intelligent jury, and thus the indicted person may be justly cleared in unfavorable circumstances, or justly convicted by facts which would otherwise never have been revealed.

If a scientist has a love for his profession, he cannot fail to have the greatest possible interest in the study and application of the microscope. The man who has made microscopy a part of his profession, will soon find his scientific and microscopical services in demand, both for investigation and research in the advancement of science and art, and for the enlightenment of medical, medico-legal and legal difficulties.

More than a mere knowledge of medico-legal principles, more than talent or even genius is requisite for the scientific practice of microscopy. The young man who is eager to begin at the very top of the ladder to study medico-legal microscopy (and all young men are eager) soon discovers that it is part of wisdom to go slowly, that creeping comes before walking, and that after all there is something not to be found in medical, legal and microscopic books, nor to be learned from the lips of a preceptor or mentor, and that this something is nothing else than experience. Experience is the essential factor in the solution of the complex and intricate problems which present themselves to the practiced scientist and expert microscopist.

Every one should know the use and application of the microscope, and the grocer, butcher and farmer in particular, should make themselves acquainted with its workings and manipulations. The physician simply must be a microscopist, or be entirely incompetent and unable to arrive at a positive, or correct conclusion in diagnosing and prognosing his case.

No man should make microscopy a profession unless he has a genuine love for it. It is generally true that men are successful only in those callings or pursuits to which they are inclined, and in which they continue from choice, and I think this is especially true in regard to the study of microscopy. Success therein means hard work even under the most favorable circumstances, and oftentimes, indeed, almost always, a long probation.

In my opinion microscopy should be made a compulsory study in all universities and colleges, particularly medical colleges, and even in high schools its fundamental branches should be taught. Microscopy is certainly of paramount importance to the pharmaceutist (druggist), chemist, botanist and geologist as well as to the physician.

In European universities every student must have completed three semesters in microscopy before he can become a candidate for his final examination. I think the United States Government should make microscopy a compulsory study in all higher grade schools, and especially medical colleges, and should encourage microscopical researches and investigations just as England, Germany, Austria and France have done during the past decade. Microscopists abroad have been encouraged by the offer of capital prizes, honorary medals, etc.

It is a wise provision of our government to enact laws for the benefit and protection of commerce, but it would be still wiser and nobler to provide laws for the advancement of science and art, and for the protection of humanity against diseases, which, in our country, are due largely to the adulteration of food and drink.

MEDICAL MICROSCOPY.

The microscope, applied in the study of medicine, can no longer be considered an accessory, but has become a necessary and highly important factor.

Microscopy is to the science of medicine what the alphabet is to reading. It has not only elevated medicine to a science, but has also thoroughly investigated and developed anatomy, histology, physiology, embryology, pathology, bacteriology, geology, botany, etc., which constitute the sciences of medicine and surgery.

Without the microscope the medical profession, the scientific physician, the expert microscopist would be at a loss in the discrimination of diseases. The physician would be unable to distinguish one disease from another with certainty, and would thus be compelled to follow the example of old-time physicians, and treat the symptoms instead of the disease proper, as the scientific physician now understands how to do. For example, in the case of a man suffering from Icterus Generalsis (Gelbsucht), commonly called jaundice, the old-timer would immediately, upon arriving at the bedside, diagnose jaundice, and treat the symptoms instead of the disease proper, the pathological condition. Now a physician would invariably endeavor to treat the cause or causes of jaundice, which would be one of the four distinct and different pathological conditions; either that of

1. Gastro-duodinitis Acuta.
2. Occlusion of the Ductus Communis Choledochus.
3. Hepatitis interstitialis racens, including Degenerations and Atropies.
4. Carcinoma Hepatis and Carcinoma duct, biliferorum.

The scientific physician would no more think of treating jaundice (the symptom) than he would treat the headache of a person suffering from typhoid or scarlet fever, or the polluted breath (fetor) of one suffering from diphtheria, or the urine of one suffering from Bright's disease, technically called Nephritis. He would instantly resort to the microscope to find the cause, *i. e.*, the pathological condition, the abnormal physiological functions, before basing his etiological conclusion. If the patient were vomiting, he would examine the vomits microscopically and thus reach an accurate and positive etiological conclusion, determining at an early date whether or not the patient was suffering from cancer of the stomach, Carcinoma Gastricum.

By a microscopical examination of the sputa, especially by (the Tinctionsmethoden) the staining methods of Koch, Erlich, Weigert, Friedlænder and others, he would at once be able to state whether or not the disease was Tuberculosis (Consumption).

Consider the importance of the microscope in the analysis of tumors. By its use the physician may readily distinguish between the heterologous types of tumors, epithelial growths, commonly called cancerous and other analogous sorts, not epithelial but fibro-plastic growths, which we denominate sarcomatous. Both are of a most malignant character and stand in contradistinction to non-malignant types of tumors or growths. The greatest success of a surgeon depends upon his distinguishing malignant from non-malignant tumors at an early date, and being able to make the excision in due time and thus save the patient's life.

The invention of the microscope was certainly a boon to mankind since it is the chief aid of physicians. A physician without a microscope, is like a man without eyes; he is unprotected and uncertain and must be considered incompetent, simply because he cannot see as far as the scientific physician who sees by the aid of the microscope.

Without the microscope the great French chemist and bacteriologist, Pasteur, would never have discovered the process of fermentation, and his bacteriological researches would scarcely have been begun, but by the aid of a microscope he has proved without a doubt that all infectious diseases are due to a bacterium, commonly called germ.

And now comes one of the greatest triumphs of the nineteenth century—nay, the greatest discovery of the age.

Prof. Koch, the world's greatest bacteriologist, has just discovered, by means of that wonderful instrument, the microscope, The Curative Inoculative Treatment of Tuberculosis, Lupus, etc.

MEDICO-LEGAL MICROSCOPY.

This is certainly a broad field, and much remains for future investigation, research and observation.

The physician must be, and the attorney should be, a microscopist. Everything that concerns a medical examination in a legal sense, or a legal examination in a medical sense, may be enlightened and accurately determined by the use of the microscope. Here are to be understood the previously mentioned cases, homicide, infanticide, rape, criminal abortions, malpractice suits, suits involving the adulteration and imitation of food and drink, etc.

Scientists have proven, within the last decade, the possibility of determining old and dried human blood spots from those made by the blood of the lower animals. It is comparatively easy for a microscopist to distinguish with certainty the blood of amphibious animals and fishes, but it is a decidedly different matter to distinguish human blood from that of the higher orders of animals.

Scientists, namely Bizzozzero, Cantani, Friedlænder, and others, have proved and demonstrated beyond a doubt the possibility of distinguishing dried and old human blood spots from those of animals, whether found upon wood, iron, cloth or other substance.

Histologists and pathologists have demonstrated the great value of the microscope in distinguishing the skin, hair, brain matter and even the excretions and secretions of the human being from those of the lower animals. Moreover, expert microscopists have proved beyond all doubt that the blood which circulates through our arteries and veins might be so contaminated with constitutional diseases, such as Syphilis, Cancer, Septicæmia, Leukæmia, and even typhoid and scarlet fevers, that it is possible to determine accurately and even beforehand the severity of the disease, to give a correct diagnosis and prognosis, and to make a clear differentiation of diseases.

How else than by the microscope could such marvelous feats be accomplished? What a safeguard is such power in the above mentioned cases.

Were it not for the microscope, it would be an impossibility for a scientist, even an expert *microscopist*, to state with a certainty that upon a certain female child, or girl, rape had been committed; this decision is a very difficult one, and can only be determined accurately and positively upon the finding of certain microscopic characteristics, such as the finding of spermatozoa, spermatic crystals (Charcots Krystalle), etc., upon or about the vagina, or its surroundings, such as her dresses, night-shirts, drawers, etc.; but upon the absence of these microscopic characteristics, rape should invariably in every instance be excluded; it is best to give the criminal the benefit of the doubt, and no *prima facie* evidence should be accepted.

In cases of infanticide it is necessary to prove whether or not the infant child has breathed. Cast a piece of lung tissue into a vessel containing water, and by its floating or sinking alone decides whether the child had breathed or not. This is the old and unreliable method. The microscope affords a much more reliable proof.

Under the microscope a section of the lung tissue of a child that has breathed presents the following genuine characteristics:

1. The lung tissue presents the appearance of being expanded, that is, the alveoli are expanded and contain air, mucus and loose epithelial cells.
2. The epithelium cells lining the alveolar walls are flattened.
3. The blood in the arteries is positively oxygenized, aerated-arterial blood.

In contradistinction to this, the lung tissue of a child that has not yet breathed reveals under the microscope the appearance of real and as yet embryonic lung tissue.

1. The lung tissue is shown to be as yet in a collapsed condition and to contain neither air, mucus, nor flattened epithelium cells.
2. The alveolar walls are lined with a well developed and as yet a distinct round cell epithelium.
3. The blood in the arteries is shown to be venous blood.

The microscope again solves medico-legal difficulties in cases of malpractice suits, poisoning, etc., by analyzing food, drink, drugs, etc.

1. It detects the slightest adulteration as well as an imitation.
2. It determines whether or not the article is spoiled or has undergone any degree of fermentation.
3. It reveals any accumulation or development of micro-organisms, such as germs, bacilli or microbes. Thus no adulterated drug, meat, or oleomargarine, can keep its secret when placed under the microscope.

LEGAL MICROSCOPY.

Legal microscopy is certainly a unique and extremely interesting study, not only to the attorney, but the physician as well. The development of this subject is due principally to Geo. E. Fell, M. D., who has bestowed upon it the most scientific and accurate study.

Microscopy, in its application to legal questions, is a novelty, and the most surprising results are anticipated from the application of the microscope in the examination of legal documents, U. S. currency, and all printed and written matter, including forgeries, mutilated wills and other documents.

More than once has the microscopical examination lighted the path of the attorney, detected the work of the forger and mutilator and shielded the innocent or convicted the guilty.

The microscopical examination of legal documents of all kinds presents a wide range of observation. We may first begin with the characteristics of the paper of the document, which may enable us to ascertain many important facts; for instance, a great similarity might indicate, with associated facts, that the documents were prepared about the same time or by the same person; a marked dissimilarity might be an equally important matter. Second, the differences in paper may exist in the character of the fibres composing it, the finish of the surface, the thickness, modifying the transmissibility of light, the color, etc. All these points may be accurately compared and differentiated by the use of the microscope. Third, the ink is to be considered and examined. In case an addition has been made to a document, within a reasonable length of time, the different inks may be clearly distinguished from each other. The following differences between the inks may be apparent:

Some inks in drying assume a dull, others a slimy surface. If in sufficient quantity the surface may become cracked, presenting, when magnified, the appearance of dried clay. It is well to note whether the ink forms an even, somewhat regular border, or spreads out to some extent. Fourth, the color of the different inks, studied by transmitted or reflected illumination, is of the greatest importance.

This difference of inks, in one case investigated by Geo. E. Fell, at least proved the addition of certain words, which completely annulled the value of a document involving several thousand dollars. In another case where words were written over the original writing, so as to convert completely, the difference of inks could still be detected by a microscopical examination. Fifth, erasures and additions are the principal points of consideration in the microscopical examination of documents. There are two distinct modes of making an erasure; first, by a sharp instrument, and second, by a chemical preparation. The former is more commonly employed and is usually accomplished by scraping the paper with a sharp knife until the writing is invisible to the naked eye. Under the microscope every stroke of the pen is visible, and even the color of the different ink may be revealed.

The more skilful mutilator employs a chemical preparation. The ink becomes a soluble under the action of the chemicals used and then is easily removed by means of a blotter or absorbent cotton. This also is an imperfect method; the letters may be readily traced under the microscope. Usually the chemical leaves a stain, and the fibres of the paper are more or less injured by its action, thus leaving evidence that the erasure has been made.

Geo. E. Fell says the eye of the individual making the erasure is certainly not sufficient, and even with the aid of a hand magnifier the object may not be effectually accomplished. The detection of an erasure made by a knife is a very simple matter and may be accomplished by a novice. An investigation may be made by simply holding the document before a strong light, and this is usually all that is necessary to demonstrate an erasure of any consequence. This is, however, a very different matter from tracing the outlines of a word or detecting the general arrangement of the fibres of the paper, so as to be enabled to state whether writing has been executed on certain parts of the document. Again, when we enter into the minutiæ of the subject, we find that the compound microscope will give us results not to be obtained by the simple hand microscope.

On several occasions, I have been able to detect additions made to certain documents, two of which were wills. The additions were made in the following manner:

First, there was an erasure, then words were written over the erasure. With the microscope, I could detect both erasure and addition; also, the different colors of inks used, and next, the most important characteristics, namely, the strokes of the pen, and finally, the general mode of execution.

A microscopical examination of legal documents, such as U. S. currency, wills, and all other printed or written matter, must consist always of the above mentioned observations. The general mode of execution includes the comparative expression of the original writing and that of the additional. Especial attention must be given to the shading, the formation of letters, both in the downward and upward strokes, capitals and small letters, punctuation marks, etc. All these points must be taken into consideration in making a microscopical analysis.

In the examination of commercial papers and documents, such as contracts, agreements, wills, notes, cheques, etc., to detect a mutilation or forgery, the application of the microscope is certainly the most accurate and reliable, as well as the easiest and simplest method. It is certainly the best method of establishing the genuineness of an autograph.

And finally, we will discuss one of the most important branches of legal microscopy, and that is the detection of counterfeit currency, both American and foreign. The detection of counterfeit U. S. currency has long puzzled merchants, bankers, and even expert cashiers. But now the most skilful counterfeiter can no longer defy detection. The expert microscopist cannot be deceived. The same rules must be observed in the microscopical examination of currency as in the examination of written and printed documents, but a certain additional observation is necessary; examine, first, the quality of the paper used; second, the execution and finish of the bill; third, the grade and color of the inks; fourth, the printed condition of the bill, including the autograph; fifth, the most important characteristic by which a genuine bill is distinguished from a counterfeit, viz., the red line running lengthwise across the bill. This line in a genuine bill is a red silk thread woven into the paper, while in a counterfeit this line is simply a line drawn with red ink.

"PURE science is the knowledge of principles and deductions. When this knowledge is reduced to a set of precepts, with practical skill as the basis, it becomes an art. When knowledge is made the foundation for practical results to be secured, it becomes applied science. A man may study physiology or pathology as abstract sciences, but when he makes a practical application of that knowledge in the curing of disease, he is engaged in professional work. The practice of dentistry is not, therefore, in any sense, the study of science. Such practice may depend upon certain scientific knowledge, but it is not of itself science."

DR. W. C. BARRETT, Buffalo, N. Y.

ABDOMINAL AND PELVIC SURGERY.

BY WILLIAM H. WATHEN, M. D., LOUISVILLE.

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ASEPSIS IN INTRA-PERITONEAL SURGERY.*

I will not discuss the broad question of asepsis versus antisepsis by the use of chemical solutions in its application to general surgery. If the proper precautions as regards cleanliness in every detail before and during an operation are observed, we need no antiseptic germicides in intra-peritoneal surgery. If solutions of sublimate, carbolic acid, etc., are brought in contact with healthy peritoneum their action is harmful, and if they do not cause immediate bad results they will cause subsequent trouble by so irritating the membrane as to result in few or many adhesions of the abdominal and pelvic viscera. They may leave the patient as much or more of an invalid than before the laparotomy. Nor will I condemn the use of chemical solutions for the purpose of sterilizing the operator, assistants, nurses or patient, or the room, instruments, sutures, dressings or sponges, if used before the operation is begun, but they should be removed from everything that is brought in with the peritoneum. Unless everything is made practically clean, independent of the germicide, it will not make it aseptic. It is too often true that operators who are loudest in advocacy of germicide solution are the least cleanly, and I have known them to forget to wash their hands before beginning an operation, or before examining a woman in labor. They wet the walls of the room and the hands that have not been cleansed in sublimate solutions, use carbolic spray, put dirty instruments, sponges, sutures and dressings in dirty vessels filled with unclean water, and expect the antiseptic to make all aseptic. Just here lies a great objection to the general use of chemical germicides, and women have died of septic infection because of reliance upon such means.

They are relatively few who know how to be surgically clean in every detail connected with intra-peritoneal surgery, and if the time and labor that have been devoted to teaching the medical profession how to use antiseptic germicides, had been directed to teaching the value of, and means of accomplishing surgical cleanliness, septic peritonitis following laparotomy would be comparatively infrequent. Of course, the above does not apply to all men who use chemical antiseptics, for some of them are the most cleanly I have seen operate, but I believe they would get as good or better results if they omitted the antiseptics. The peritoneum is usually infected by contact, and the danger of atmospheric infection is practically *nil*, as has been shown by the excellent results in laparotomies done in large and crowed amphitheatres.

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*From the Transactions of the American Association of Obstetricians and Gynæcologists, 1891.

The following order may be observed in describing the means of making and keeping everything aseptic in abdominal and pelvic surgery:

1. The operating room and the room in which the patient is to remain during convalescence. 2. The patient. 3. The operator and all assistants. 4. The kind of water to use. 5. (a) instruments; (b) sutures and ligatures; (c) sponges; (d) dressings and towels. 6. Irrigation. 7. Drainage.

The operating room should be so constructed that the floor, walls and furniture may be washed regularly and kept clean. If the operation is done in a private house, it is well to remove the carpet and curtains some days before and wash everything in or about the room, but do not attempt to disturb the dust by brushing the day the laparotomy is to be done. If dirt has then accumulated that must be removed, it should be done by wiping or washing with a towel, and this must be done, if we operate in emergency cases, where we have no time to make extensive arrangements. I doubt, if there is any advantage in using the spray or burning sulphur, unless the room has been occupied by a patient with an infectious disease. Asepsis is more easily accomplished in well-regulated private or public hospitals or infirmaries. In private houses septic matter may more readily be introduced unless the operator or an experienced nurse rigorously superintends everything before and during the operation. But good results may be obtained in uncleanly rooms and surroundings, if the wound and the peritoneum are protected from contact with anything septic. This, however, should not be an excuse for operating without preparing the room, for dangers of infection, are multiplied many times; the hands, sponges, towels, etc., may unconsciously come in contact with poisonous matter, and it requires unremitting watchfulness to prevent it. This danger is practically removed where we take the proper precautions, when we have time to do so before operating. The room in which the patient is to remain after the operation, should be made clean, as should also the mattress and bed covering. This is especially necessary where the drainage tube is used.

In operating rooms at hospitals or infirmaries the operating, nurse and instrument tables are more easily kept clean if they have plate glass covers. The instrument trays and pans for sponges and dressings should be white china or white porcelain lined, so that we may readily see if they are unclean.

The patient should be given one or more hot baths with soap and brush before the operation, and every part of the body, including the hairs on the head, under the arms and over the vulva, should be carefully cleansed. The pubes should be shaved, and it is well to scrape away with the razor the epidermal scales from the anterior surface of the abdominal wall. Before making the abdominal incision the abdomen should again be washed and wiped dry with a clean towel. A hot enema and a copious vaginal injection should be given before the operation. Dry sterilized towels should be placed over the pubes and upper part and sides of the abdomen over which there should be spread a large piece of several thicknesses of dry sterilized gauze with an opening cut for some inches over the point where the incision into the cavity is to be made. This prevents the hands, instruments or sponges coming in contact with septic matter about the clothing or the operating table.

The same care in preparing for an operation that is required of the operator should also be enjoined upon the assistants and the nurses, otherwise it is impossible to know if septic matter has been introduced. Visitors should not be permitted to come near the patient or anything that is to be used in the operation, nor should they touch the hands of any one who is to assist in any capacity in the operation. The operator should prepare himself as carefully as he has had the patient prepared, and should put on clean linen before each operation. His nails should be closely trimmed and scraped, and *just before* he begins an operation his hands and arms should again be carefully washed in hot water with soap and brush. He should then put on a clean white apron, reaching from the neck to below the knees, and extending entirely around the body, so as to prevent the hands coming in contact with his clothing. He should have a pan of hot sterilized water on his instrument table to dip his hands into when soiled with blood or other matter.

All water used in the operation should be sterilized by boiling not less than thirty minutes, and if we cannot get water that is relatively clear and clean it should be distilled or filtered through a Pasteur filter before it is boiled. The vessels in which the water is boiled, should be washed in hot water with soap, and should be used for no other purpose. The water for the sponges and irrigation should be boiled some hours before the operation so that it gets cool enough to use, but the water to be put in the instrument and suture trays and the pan for the irrigation and drainage tubes and needles should be boiling when the operation is begun.

The instruments and needles should be washed with great care in hot water with sapolio. It removes the oil from new instruments and the blood or other secretions from instruments that have been used, better than any soap, I have tried. The hairs of the brush should be pushed into the irregularities and holes in the instruments, and through the eyes of the needles, otherwise all the dirt will not be removed. Instruments should be washed after being used before the blood has hardened on them, and should be wrapped in a sterilized towel until they are needed. When any of the plating is worn off they should be replated. They should be kept in boiling water with a little carbonate of soda to prevent rust a few minutes immediately before using.

The best suture or ligature for general use, and it will serve nearly all purposes in intra-peritoneal surgery, is the Chinese hard twist silk of different sizes. It should be selected from unbroken packages and never handled with hands that have not been washed; nor should it ever come in contact with anything not clean. This suture may be sterilized in several ways, but the most reliable method is to wrap three sizes on three separate small glass spools and put them in a test tube and stopper it with a piece of absorbent cotton. This should be kept for an hour for three consecutive days in a Koch's, or some approved sterilizer, at a heat of 212° F. Each tube holds enough silk for a laparotomy and may be kept indefinitely in an aseptic condition if the cotton is not removed. Or the silk may be sterilized on large glass spools which may immediately be put on reels in glass suture boxes and kept covered with alcohol. These sutures may, however, be made practically sterile by putting them in an iron porcelain-lined pan of boiling water and keep the water boiling for thirty minutes before and during the operation. The glass drainage and the irrigation tubes and the needles may be kept in the same pan. Silk worm gut may be carefully washed and made sterile by boiling. This may be done during the operation, or, if done previously, they should be put in long glass sterilized tubes and absorbent cotton tightly introduced into the ends, or they may be kept in hermetically-sealed glass jars, or in alcohol. Silver wire should be cut into pieces twelve inches long, then washed and made bright with sapolio, and when boiled kept also in glass tubes, or they may be washed and boiled when we want to use them. They may also be sterilized and kept on large spools in the glass suture box filled with alcohol. I will not speak of the preparation of the cat gut or the kangaroo tendon. Soft and well-shaped sponges should be selected and prepared after the following fashion: They should be hammered on a marble slab with a wooden mallet as long as any sand, lime or dirt can be gotten out of them. They should then be washed in cold water and put twelve hours in water made disagreeably sour with hydrochloric acid. The acid is washed out of the sponges, and when they are dry, they are again hammered with the mallet to see if any more sand or lime can be gotten out of them. They are now carefully washed in cold water and kept for six hours in a mixture of sulphurous acid one part, and water five parts. This is washed out in clean water and the sponges wrung dry and immediately put into a large glass stoppered jar or bottle filled with alcohol. Sponges that have been used may again be made clean if they have not come in contact with septic pus. Immediately after the operation, have them washed and then put for twelve hours in a strong solution of carbonate of soda. This will dissolve all organic matter so that the sponges will be relatively clean when the soda is washed out of them. They are then put in the sulphurous acid and water as above and kept in alcohol. There are other ways of preparing sponges, but this is the simplest and most perfect. The sponges should be prepared by the operator, or under his immediate supervision, otherwise the process may be imperfectly observed. It is best for each operator to prepare his own gause. It can be purchased in rolls of 25 to 100 yards, free of oil, and ready to be sterilized. This is best done by putting it in loose folds in a sterilizer for an hour for one or more days. It may then be put into aseptic glass jars with ground stoppers, or in small jars with glass tops that fit so tightly upon gum bands that air can not be admitted. Enough may be put in one jar for a laparotomy, and it will remain sterile. If any antiseptic is preferred it may be used on the gauze when preparing for an operation, but as gauze, properly sterilized, is free of pathogenic germs, why use the antiseptic? It can not make it more aseptic. If there is any doubt as to perfect sterilization the germicide may be used.

If it is not convenient to sterlize the gauze as above, it may be made practically sterile by boiling it for thirty minutes before and during an operation, but dry gauze should, if possible, be used, especially over the abdomen and the wound.

If towels are carefully washed and boiled in clean water for thirty minutes, they are usually sufficiently aseptic, if they have not been used except in the operating room. They may be sterilized as carefully as the gauze, but this is a troublesome process and is probably not necessary.

In suturing the abdominal wound the edges should be evenly coapted, but if the sutures are tied too tightly with stitch abscesses will follow in the practice of the cleanest operator, because it furnishes necrosed tissue in which pathogenic germs may develop. The abdominal wall should be made clean and dry before the dressings are applied, and well dusted with boric acid, an excellent means to keep the wound dry. The several layers of gauze and the thick layer of absorbent cotton, should be strapped tightly to the abdomen by three inch wide gum adhesive plaster. If the glass tube is used the dressings should be perfectly fitted around it.

If the peritoneum has become soiled with blood, pus, or the contents of cysts, the cavity should be thoroughly irrigated with water from 100° to 110° F. This is best done with a long glass tube, with holes at the end and on the sides, attached to a gum hose. An iron granite or glass funnel is introduced into the other end of the hose and the water poured from a pitcher, is forced into all parts of the peritoneal cavity by hydraulic pressure.

To get a good polish on mahogany easily: Mix one part of boiled linseed oil with two parts of alcoholic shellac varnish. Shake well before using. Apply in small quantities, with a cloth, and rub the work vigorously until the desired polish is secured.

A DEATH FROM CHLOROFORM.

Another death from chloroform is added to the list which, as years pass, continues to grow larger. This time it occurred in the city of Indianapolis, in the hands of Dr. Wm. Wishard, Professor of Genito-Urinary diseases, in the Medical College of Indiana. Dr. Wishard is one of the most eminent men in the profession of the West. In addition to this, he is one of the most careful, conscientious, thoughtful and honest men, as well as courageous.

We present herewith a report of the case as made by Dr. Wishard in a paper before the Marion County Medical Society, at its meeting, January 26th, 1892.

Mr. President and Gentlemen:—I have been requested by a number of members of this society to present a report to-night upon a death from chloroform which occurred in my practice on last Monday, January 18, 1892, at St. Vincent's Hospital, in this city. In complying with the request, it is not my intention to go into an extended discussion of the use of anæsthetics, but rather to give a report of this case as a basis for discussion of the general subject by this society.

The patient, Mr. I. L., aged fifty, referred to me by Dr. Theodore Kern, of Kokomo, Ind., had been suffering some seven or eight months with a prostatic cystis; he had a specific urethritis about eight months ago, followed by a prostatic abscess, and this abscess had opened spontaneously in the perineum, and also, as was shown by *post-mortem* examination, had opened into the prostatic urethra. There were, in consequence, three or four openings, through which a portion of urine passed at each effort to empty the bladder.

The operation contemplated was to make a median perineal opening and curette out the fistulous tracts, and to use prolonged drainage through a tube, introduced through the perineal opening to secure rest and drainage for the bladder and closure of the fistulous openings. The perineum was bathed with pus on the day I first examined the patient, and I was told by Dr. Kern that more or less active suppuration had been indicated by the amount of pus which had been drained constantly through the perineal openings. The patient's general condition was apparently fair, considering the asthenic influence of the long-continued suppuration. He was a man of good physique, but somewhat emaciated and enfeebled by his illness. He complained of nothing aside from the foregoing which would suggest the impropriety of using anæsthetics. It was evident that he must die 'ere long, as a result of the drain upon his vitality, if the bladder was not put to rest by drainage. The probability of early renal involvement, was an added reason for immediate effort at surgical relief, and the patient was anxious that the operation should be done at once.

The use of the anæsthetic was begun at 3:15 P. M., in the clinic-room at St. Vincent's Hospital, in this city, in the presence of the class of the Medical College of Indiana. The inhaler used was an ordinary paper cone, and was held by my assistant, Dr. John Akester. I had directed him to give chloroform until the patient was relaxed, and then to substitute ether in order to shorten the first stage of anæsthesia and thereby shorten the time the patient would be under the anæsthetic. I personally observed and directed each step of the administration of the anæsthetic, and the operation had not commenced at the time the patient died. The chloroform was applied to the cotton twice. Dr. Akester says that he put not to exceed one drachm upon the cotton the first time. The inhaler was held near the patient's face, perhaps at first some six or eight inches from the mouth, and gradually held closer, but at no time held tightly over the mouth or in such position as to exclude atmospheric air. Squib's chloroform was used. The patient struggled somewhat violently during the first two or three minutes, and did not seem to be getting enough of the anæsthetic to produce relaxation. I then directed Dr. Akester to put a little more chloroform upon the inhaler. I saw the amount applied the second time, and am sure it did not exceed one drachm. After the patient had taken perhaps three or four inhalations, and while I was standing at his right side, holding his lower limbs, and with my face toward him and my back toward the class, his legs suddenly relaxed, and Dr. Frank Hutchings, who was standing upon his left side, holding his finger upon the pulse, warned me that the pulse was growing very feeble. I was watching the patient's facial expression and respiration at the time, and, as Dr. Hutchings spoke, I noticed the blanched expression of the patient's face and that his respiration at that moment stopped. The anæsthetic was instantly withdrawn, and, with the assistance of others, I lifted the patient off the upper end of the table and held his head down toward the floor. The face colored slightly and he was again put upon the table, the tongue pulled forward with a pair of forceps, the chin elevated, and artificial respiration commenced. As the tongue was drawn forward, the patient gave a slight gasp, which was subsequently repeated once or twice. Nitroglycerine, tincture of digitalis, and strychnine were successively used during the succeeding five or six minutes by hypodermic injection. Sharp pressure was made over the epigastrum and efforts at artificial respiration constantly maintained. After the patient had again been placed upon the table, Dr. Hutchings placed his ear over the heart and said he could hear a slight fluttering. This was after the faint efforts at breathing above referred to had ceased, but there was no radial pulse. My first impression was that the heart had ceased first, as my attention was first called to it by Dr. Hutchings while I watched the patient's breathing, which ceased almost simultaneously with the remark made by Dr. Hutchings. In reviewing the case now, it seems probable that my first impression, that the heart had ceased before the respiration, was not correct, as Dr. Hutchings heard the heart beating faintly after the two or three slight efforts at respiration had ceased. A battery was not at hand when the collapse occurred, and I do not believe if it had been instantly applied that it would have availed anything, as I never saw death come with such terrific suddenness.

Dr. Akester, who was using the chloroform under my direction, has had frequent experience and observation in the use of anæsthetics, and I regard him as unusually careful and capable. In this instance it might be said that I was practically administering the anæsthetic myself, inasmuch as I had told Dr. Akester exactly what I wanted done, and was standing by watching the patient breathing and personally directing each step. The operation had not begun, and in reviewing the case now I cannot see anything in the detail of the steps taken which could or should have been different, and can only regard the result as one which may happen in the experience of any surgeon.

I was present at the *post-mortem*. The heart was perfectly normal in appearance, as was the right lung. There was some apparently recent congestion of the lower lobe of the left lung, which, however, was not apparent on physical examination of the chest before death. There was evidence of a recent mild peritonitis. The liver was unduly hard and friable. Both kidneys were a little larger than normal and somewhat congested, and were quite friable. I obtained specimens of the heart, both lungs, the liver, and both kidneys, and gave them to Dr. B. Hessler, Demonstrator of Pathology in the Medical College of Indiana, for microscopical examination, and I submit his report below. I have learned since the patient's death what I did not know at the time, namely, that he had led a dissipated life, and had long been addicted to the excessive use of stimulants. It seems fair to presume in this case that death was not due alone to the chloroform poisoning. The patient's vitality had been lowered by long-continued suppuration resulting from the prostatic abscess, and the personal history obtained since his death, together with Dr. Hessler's report, suggests that there were other factors which can reasonably be regarded as having had a potent influence in producing the fatal result.

It is interesting in this connection to note the practical conclusions resulting from the Second Hyderabad Commission. This second commission summarizes its conclusion under fourteen different headings. I quote their third, fourth and fifth conclusions as bearing upon this case:(1)

"3. To insure absolute freedom of respiration, tight clothing of every kind, either on the neck, chest or abdomen, is to be strictly avoided; and no assistants or bystanders should be allowed to exert pressure on any part of the patient's thorax or abdomen, even though the patient be struggling violently. If struggling does occur, it is always best to hold the patient down by pressure on the shoulders, pelvis or leg, without doing anything which can by any possibility interfere with the free movements of respiration.

"4. An apparatus is not essential and ought not to be used, as, being made to fit the face, it must tend to produce a certain amount of asphyxia. Moreover, it is apt to take up part of the attention which is required elsewhere. In short, no matter how it is made, it introduces an element of danger into the administration. A convenient form of inhaler is an open cone or cap with a little absorbent cotton at the apex.

"5. At the commencement of inhalation care should be taken by not holding the cap too closely over the mouth and nose to avoid exciting struggling or holding the breath. If struggling or holding the breath occurs, great care is necessary to avoid an overdose during the deep inspirations which follow. When quiet breathing

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1. See Sajous' Annual of the Universal Medical Sciences, 1891, Vol. III.

is insured, as the patient begins to go over, there is no reason why the inhaler should not be applied close to the face ; and all that is then necessary is to watch the cornea and to see that the respiration is not interfered with.''

The following is Dr. Hessler's report :

MICROSCOPICAL EXAMINATION.

''The organs examined microscopically were the liver, the two kidneys, right and left lung, and the two ventricles of the heart. A number of sections were made of each. The only abnormal or pathological condition that appears to be common to all these organs is an amyloid degeneration of the walls of the arterial blood-vessels.

''The liver, heart and one of the lungs are apparently normal, excepting the slight amyloid degeneration of the blood-vessels. One of the lungs is considerably congested, and seems to be somewhat emphysematous.

''The kidneys are inflamed. In one the epithel lining of the tubules is swollen and distorted ; a tubal or parenchymatous nephritis was apparently going on. Some of the tubules contain clear or hyalaline 'tube-casts.'

''The other kidney is a typical case of 'sclerosed kidney.' The interstitial tissue is very much increased, in some places to such an extent as to entirely obliterate the tubules. Small groups of dilated tubules minus their epithelium are common.(1) Normal tubules are comparatively rare. The epithelium of the none-contracted tubules, is in an inflamed condition. The walls of the arterial blood-vessels are very much thickened, as is usual under such conditions.

''Amyloid degeneration of the walls of the blood-vessels occurs in both kidneys, as has already been mentioned above.

''Sections examined : Lung, six ; liver, four ; heart, three ; kidney, six ; kidney, thirteen.

January 26th, 1892. B. HESSLER, in *Medical Mirror*.''

The *British Medical Journal* is of the opinion that it requires no prophetic power to foresee that we are on the threshold of discoveries in medicine, such as will eclipse in their splendor all that have preceded them.

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1 "These dilated tubules are invariably filled with cellular elements minus a nucleus. They were at first sight thought to be blood, but they do not stain as blood usually does. As suggested by Green (Pathology, p. 404), they are perhaps epithelial proliferations, with some escaped cells from vessels."

DENTISTS AND THE AMERICAN MEDICAL ASSOCIATION.

EDITORIAL, INTERNATIONAL DENTAL JOURNAL, OF JAN., 1892.

The last number of this journal (December) contained a circular letter from Dr. Dunglison, secretary of the American Medical Association, and an accompanying explanatory letter from Dr. Talbot, of Chicago, ex-president of the Oral Section of that organization.

The notice of Dr. Dunglison was remarkable for the absence of any allusion to dentists or the resolution adopted by the American Medical Association, and, as it stands; has no force with those holding the D.D.S. degree. There has been a constant misunderstanding in relation to the position occupied by dentists in this body, which is explained in the letter of Dr. Talbot, and there need be no further misconception in regard to the position occupied by those who hold the so-called "partial degree."

That this explanation will be satisfactory is exceedingly doubtful. It involves so many conditions that it practically makes membership in that organization impossible. The first requirement is that an applicant for membership must belong to an association working under the code of ethics of the American Medical Association. In the second place, he must be a graduate of a department connected with a medical school or university; and third, if so connected, he must have taken the regular course with the medical students, omitting certain studies and replacing these with certain others.

The first condition is possible of attainment, provided a sufficient number of members of a local society should be willing to adopt the code required. Membership in medical local societies is impossible, at least in the East, for those holding the D.D.S. degree. This being so, we cannot understand how a dental society can be recognized as a whole; indeed, it seems directly in conflict with the constitution, which requires membership in medical societies.

The matter is so much mixed and so inconsistent with itself that explanation serves only to make confusion worse confounded.

If the society or club adopting the code can be represented, there will certainly be delegates sent and application for membership made by persons who have not complied with the second requirement by graduating from a department of a medical college or university.

It must be recognized that this open door, if it means all that Dr. Talbot claims for it, is a liberal construction of the constitution, and as such should meet with a generous response.

The third requirement means the rejection of all those not graduates of certain schools, or, in other words, it says emphatically to these schools, "Your graduates can never be recognized by medical men as specialists in medicine."

The question of recognition is not one that interests us, and, further, it has been amply discussed elsewhere. The only thing to be considered is, is it just? We cannot so regard it.

The degree of M.D. in the United States has been trailed in the mire from the first organization of medical schools. It should stand for the highest culture in this profession. Does it do this? Until within the last three years nearly three-fourths of all medical schools in this country had a course of two years, or two sessions of generally five months each. The report of the Commissioners of Education for 1885–86 gives the number of regular medical schools as ninety-four; of these, seventy-three (73) had courses of from one to two years; twenty-one (21), from three to four years. The report for 1887-88, the last issued, gives the number of the regular schools in the United States as eighty-nine; of these, twenty-four (24) had two years, and sixty-five (65) had courses of from three to four years. Of this number in 1887-88, fifty-two (52) had courses of from five to six months, nineteen (19), over six months, and eighteenth (18) failed to report.

It will thus be seen that up to the period of 1885–86 the M.D. degree was conferred in a large majority of the schools after two courses of about five months each, and even at the date of the last report there were still a large number graduating men in the same period. It cannot be denied that men have been sent out by the thousands, to stand by the bedside of other thousands in their last extremity, with an amount of theoretical information so limited that it is not surprising that to the average layman the titles doctor and undertaker are nearly synonymous.

While dental colleges have been equally derelict in their duty in the past, there can be no comparison drawn between the two conditions when the amount of work and responsibility in medicine is considered.

It must, therefore, be recognized that, however exalted the M.D. degree may be in the estimation of society at large, to the specialist it means something or nothing just in proportion to the amount of training and the character of that training.

The dental schools of the country have now, without any exception, three years, the majority with five months as a term. Under this state of things it may not be wholly inappropriate for the dentist of the near future to retort, with some degree of consistency, "We refuse indiscriminate association with men who make the impossible claim of having been educated in medicine in two years."

The main question now is, is it possible that dentists can, in the present state of affairs, work harmoniously with medical men? No man can or should be recognized, no matter what degree he may hold, unless he is able to demonstrate that he has that above all degrees, knowledge and ability to place his information in practical directions for the good of humanity and for the advancement of science. We hold that a large proportion of dentists have arrived at that condition of culture, and are able to maintain not a mediocre position, but one that must reflect credit on themselves and medical science; for whatever has been acquired in a special study becomes legitimately part of the whole. It is time that dentists should abstain from asking for recognition. It is humiliating!

The appeal, if it can be called such, of Dr. Talbot, for dentists to unite with those bodies of a truly scientific character, should receive earnest attention. The day is past for organizations such as we have had, and the line must be positively drawn between those who join societies for selfish purposes and those who have only the highest professional and scientific interests at heart. We believe this may be attained in an association in dentistry proper. If it exists in the Section of Dental and Oral Surgery of the American Medical Association, it is a positive misfortune to that body that it is deprived of the hearty co-operation of men worthy in every respect, but who cannot show that they graduated from a medical college, but are simply energetic workers in their chosen field of scientific research, with a degree that has not yet received the stamp of respectibility from the social world. The highest attainment any one can reach is a self-respecting culture, and this will command recognition everywhere where civilization extends, and is not wholly dependent on parchments or the artificial bars that caste places round the recognized professions.

THE NEW SCIENCE.

GREAT PRACTICAL BENEFIT RESULTING FROM BACTERIOLOGICAL STUDIES.

FROM THE NINETEENTH CENTURY.

During the present century the scientific world has watched the growth of an entirely new branch of knowledge, the fundamental principles of which have been elucidated by workers in many different divisions of natural knowledge, by chemists, physicists, botanists, zoologists and physicians. The elementary facts of "the new science" having been discovered, the new data threw a flood of light on the whole field of science, and results of immense practical value were the immediate outcome of discoveries which at first appeared to be of theoretical interest only. It is a well-established fact that a man who has once suffered from a given infectious disease is, for a time at least, proof against that same disease. A child, for instance, which has had small-pox, scarlet fever, typhoid or measles will not again for some time be susceptible to any of these infections. Pasteur, guided by this fact, and knowing that even a mild attack is a protection, concluded that if it were possible to give an animal a modified form of a specific malady caused by a specific microbe, the animal would be in future proof against the attacks of the same micro-organism.

After investigating the subject for a long time, he succeeded in vaccinating fowls against fowl cholera, a disease produced by a specific micro-organism. He discovered that an old culture of these microbes injected into fowls gave rise to very slight symptoms only; that the fowls soon regained their health, and, after recovery, resisted the action of the most virulent baccilli, the injection of which would otherwise have proved fatal. Turning his attention to anthrax, Pasteur, in 1881, published his method of "vaccinating" animals against this disease. Anthrax chiefly attacks sheep, but not unfrequently proves fatal also to horned cattle, horses and man, and is one of the great scourges in France and other countries, more especially Russia and Australia. Since Pasteur's discoveries, agriculturists have learned the value of preventive inoculations against anthrax and have extensively applied this method. In France, for instance, more than 2,500,000 sheep, 320,000 head of horned cattle and 2,861 horses have been inoculated with vaccine prepared in the Paris Institute. The same institute in 1888–1889 sent out material for the inoculation of 1,000 elephants in India, and some years ago the British government sent several native gentlemen to Paris on purpose to learn the way of preparing the anthrax vaccines.

The Russian government has established in several parts of the empire institutes where "vaccines" are specially prepared. The Austrian government has resolved to found a similar institute, and lately sent to Paris one of its most eminent scientific men, Professor Weichselbaum, for the express purpose of learning the necessary manipulations. The system was introduced two years ago into Tasmania, and during the last Congress of Hygiene, Mr. Park, head of the Veterinary Department of Tasmania, repeatedly assured me of its efficacy. In England inoculations have been carried out with marked success by Professor Pemberthy, of the Royal Veterinary College, who, in a letter, tells me that "the process is most easy of adoption," and that "Pasteur's system has so far proved the best method of protecting animals against anthrax." It has been proved that bacteriology is the direct outcome, not of one branch of knowledge only, but of all the divisions of natural science, biology, chemistry and others. But during its growth even, it shed the greatest light on the sciences of which it is an offshoot.

The first step in bacteriology was made through chemical investigations; but, on the other hand, see what the new science has done for chemistry. It has solved for chemists some of the chief problems connected with putrefaction and fermentation—problems which were previously in a state of hopeless obscurity. Through bacteriology chemists have learned that each kind of specific fermentation is due to a specific micro-organism, which, placed under definite conditions, produces definite chemical substances, and in this manner bacteriologists have discovered substances, the existence of which chemists did not even suspect. Have not bacteriologists also revolutionized botanical methods by new modes of cultivating micro-organisms; by showing that every colony of microbes has its own particular aspect; by improved methods of staining, so that previously invisible bacteria are now easily seen; by inventing photographic processes of such delicacy that structures invisible to the naked eye, are now readily perceived in the plate; and by encircling the flora with countless new genera previously unknown?

The men to whose genius we owe the "new science" were merely seeking for truth, and had no practical object in view, but gradually gained this useful knowledge through experiment—physical, chemical and physiological. Hundreds of human lives snatched from death through Pasteur's treatment; thousands of human beings restored to health every year through perfected systems of medicine and surgery; millions of animals protected against infectious disease, have been saved through the knowledge gained by experiments on animals. Those who expect that the science of medicine will make any startling progress without having recourse to experiments on animals might just as well expect to see brilliant discoveries in chemistry without new and improved methods of chemical experimentation.

CARDINAL POINTS IN BACTERIOLOGY.

The *Bachteriological World* says: The word germ, bacteria, microbe schizomycetes are used in our present literature almost as synonomous terms, but microbe seems preferable to germ or bacteria, and schizomycetes is a better scientific term than either.

That these are unicellular and assimilate nourishment seemingly by absorption in the media in which they live, but they must transform (alter) the foods found proper, and yet unfit in nature, for their use and appropriation.

Bacteria living on dead matter encounter no living resistance, whilst those feeding on living tissues, or fluids in living tissues, meet the living cells of the body and have to combat them.

The diastases secreted by the various beings, whether highly organized, or unicellular and microscopic, have something in common as to their respective objects and their properties of transforming matter.

The role of microbes in the world, is complex and necessary, though some are injurious. They act as scavengers, return to the air and water the organizable elements abstracted daily by the vegetables of the globe, and indirectly by animals, and indispensable to life.

The bacteria that invade living organisms which happen to be fit for their nourishment and growth are, in a sense, parasites just as much as the tapeworm is.

Spontaneous generation of living organisms, no matter how little, is a fallacy.

THE NAMES OF THE GRIP.

There is more in a name than Juliet would have us believe, and in medicine especially, we can often learn much concerning the nature and symptoms of diseases that have raged in epidemic form in past ages merely from the names that have been applied to them at different times, and by different people. A good example of this is furnished by the strange malady that has been traveling around the globe for the past eighteen months, and which we now call the influenza or grip. The word influenza is Italian, and means nothing more than influence. We find the term first employed in the writings of Huxham, who, in referring to the epidemic of 1743, speaks of a fever "quæ per totam Europam hoc vere sub nomine influenza grassata est." We see from this word how widespread was the affection, since of all epidemic diseases this especially was attributed to atmospheric influence,[1] nothing less universal than the atmosphere itself being deemed capable of diffusing so widely the materies morbi.

On the other hand, the word "grip" (French, *la grippe*), which curiously enough was also first used in the epidemic of 1743, bears witness to the suddenness of the attack, for, although there is some uncertainty as to the derivation of this word, it comes most probably from the French *gripper*, meaning to seize or take suddenly. Other names indicating the suddenness of the seizure were "le horion" (the thump), applied to an epidemic in France in the fifteenth century, and "Blitzkatarrh," given by the Germans to another epidemic in 1781.

The predominence of catarrhal symptoms in many of the epidemics, is shown by this last mentioned name, and also by the terms catarrhus epidemicus, synocha catarrhalis, febris catarrhalis, epidemic, le grand rhume, etc., applied to the disease by many writers in the seventeenth and eighteenth centuries. "Russian catarrh" indicated not only the supposed nature of the affection, but also the region in which it was believed to be epidemic, and from which the recurring epidemics were sent forth to visit Europe and America. An obstinate cough was a noticeable sequel of the disease in many of the epidemics, hence we find the names "tussis russa,'' ''epidemic cough,'' ''febris thoracica,'' ''quinte,'' ''coqueluche,'' ''Schafhusten,'' etc.

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[1] This is the most commonly accepted explanation of the term, though some authorities refer it to a supposed influence to the stars, and the older Italian writers describe the disease as "una influenza di freddo."

An evil conscience is one's first accuser, and herein lies the reason why men have always regarded epidemics as the chastisements of an offended deity. And it is only within a short time that we have learned that sins against sanitary laws bring more speedy, and just as certain punishment as do offences in the moral order. The sufferers from influenza were, of course, on the lookout for the sin which had brought the visitation upon them, and they usually found it, their only difficulty being in pitching upon the one sin most deserving of chastisement among the many to which they were given. In one epidemic occurring in Paris, which was called '' the blow,'' it was believed that those only were attacked who had sung an indecent song that had happened to have a great popularity just before the outbreak of the grippe. So the poor sufferers had not only to endure the pains and discomforts of the disease, but also the jibes and reproaches of their dear friends for having been found out in the sin of singing an obscene ditty. History does not state that any one regarded himself as unjustly punished for an offence he did not commit, and very likely there was none such.

There were many other names than those we have mentioned which were applied to the influenza in one epidemic or another, but most of them had only a local meaning, the significance of which has been lost to us. Among these we find the ''dunce's malady,'' ''pumpkin disease,'' ''polite sickness,'' ''Spanish pip,'' '' new delight,'' '' petite poste,'' '' folette,'' '' coquette,'' '' the general,'' ''fashionable fever,'' ''turning disease,'' ''flosse kolen,'' '' Burzelen'' and '' disease of the bald-heads.'' In the island of Martinique it was thought that the disease had been brought by the French soldiers, whence it was called '' le chapeau quarre.'' Often people gave up in despair any attempt to find an appropriate name for the affection and called it simply '' the epidemic,'' '' the disease,'' '' the disorder '' and the like, terms about as definite and descriptive as '' it,'' which was the appelation chosen by a medical writer in a neighboring city in a recent contribution to one of the New York dailies.—*Editorial Medical Record.*

OBSCURE PAINS IN AND ABOUT THE JAWS.*

By obscure pains is meant pains, the causes of which are more or less evident or not evident at all.

Let us review or recall diagnostic signs as lying with pain itself.

We are to remember that, by reason of causes or conditions, pain varies from simple departure from ease to unbearable agony, and this not at all as significant of danger or the absence of it, but as expressions of location ; example of the former is to be made by reference to pneumonitis, or, better, to Pyer's patches in typhoid ; of the latter to pulpitis. All are familiar with the stitch in the side of pleurisy. To hear this last complaint from a person leads at once to the diagnosis of pleuritis. Acute and throbbing pain in the region of cellular tissue points with certainty to a developing boil or carbuncle. Obtuse and heavy pain located about the liver or lung points to inflammation of these organs.

A bone inflammation is expressed in a sense of gnawing ; a skin inflammation is located, even under one's unremoved clothing, by an itching combined with burning that is indicative of it ; the conjunction of itching about the glans penis and stone in the bladder is familiar ; coxalgia, as pointed out by pains at the knee ; neuralgia, as differentiated from inflammatory pain by its sharp and lacerating and shock-like expression ; throbbing, as denoting approach to suppuration, etc.

The first and most common cause of jaw pain is odontalgia ; significant of :

1. Exposure of tooth-pulp.
2. Peridentitis.
3. Sensitive dentine.
4. Confinement of gas or pus in a closed pulp-cavity.
5. The presence of granules of osteo-dentine in a pulp.
6. The recession and absorption of gums and alveolus.

These are familiar, every-day experiences, too common to need else than attention being called to them in a preliminary way. To these are to be added the pains of the dentitional period, etc.

Following these I would place syphilis of the tertiary form ; undeveloped teeth : first, wisdom-teeth of lower jaws ; second, supernumerary teeth ; third, anomalous or unique growths.

Next, rachitic conditions in children : the discomfort lying here

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*Part of a paper read before the New York Odontological Society, October, 1891, and published in *International*, by Prof. J. E. Garretson, Philadelphia.

in a loose relation of the teeth with their sockets. Diagnosis is plain, relating, as it does, with a prevailing cachectic state.

I would place next, drawing on my own experience, pains in the mental region of the lower jaw that strike a patient suddenly, increase gradually, being soon seconded by a puffy inflammatory enlargement of the whole chin region, indicative of a free effusion of a plastic lymph, and which has its termination invariably in the loss of the teeth of the region by exfoliation in the shape of sequestra of the alveolar process.

Next is to be placed a dull, heavy, demoralizing pain, situated in the region of a cheek, where cause lies with closure of an artificial opening of an antrum, in which inflammatory change has destroyed the ciliated expression of the mucous lining of the cavity, and where, consequently, the secretion lodges and remains on the floor of the cavity.

I have had patients come to me from the distance of a thousand miles to consult, where the whole fault, if I may be pardoned for the suggestion, lay in the attempt of a dentist or physician to close a break in the antrum. I do not allude to those slight breaks that occur in extracting teeth, for such breaks close themselves. The condition referred to, is where there has been a degenerative inflammation that has removed a portion of the floor by sequestration. Physiological changes in the mucous membrane have here occurred, which make closure of the break one with retention of the secretion. In my own practice, where an antrum has remained open some time, and where there has been a general inflammation about the part, I always advise keeping the break open.

Next, erysipelas. This specific inflammation, when appearing on the face, expresses itself primarily as of deep origin. A person will complain of pain about the head and jaw, situated principally over the malar bone. The part is sore on pressure. You look into the mouth of the person, but see nothing. You wait a few hours, and now find a developing tension. Here is plainly shown a perversion of the circulation, indicative of inflammatory change. A little later the blush expressive of erysipelas is seen. I have never known a case of local erysipelas that would not yield to a direct application of iron, quinine and cinchona. A wide-thinking man may accept this specific, yet will not be deterred asking as to probable constitutional conditions. The prescription is as follows :

R. Tinct. ferri chlor .... ℥ i
Quiniæ sulphatis .... ʒ i
Tinct. cinchoaæ .... ʒ ij M.

The affected part is to be painted and repainted till the red blush disappears.

This is not an agreeable application; it blackens the part. I have found from hospital experience that the ordinary benzoinated oxide of zinc ointment is a salve that may at times happily and efficiently replace it.

Next, malaria pain. Malaria pain finds expression, malaria being the "dis," in a lack of comfort about the teeth that is not easily described. The patient complains of an uneasy sensation in the organs. You find them perfect, perhaps, and are led to an inference of malarial relation through practice of the process of exclusion. Taking, say, twenty possible causes, of which malaria is set down as the twentieth, and not finding the trouble related with any one of the nineteen other causes, one only remains, namely, malaria.

Do we know certainly how many causes there are in the circle of jaw pain? No, we do not. So, sometimes we must feel our way by means of treatment. First, in a case of inferred malarial poisoning, as just referred to, the way is felt to an endorsement of our conclusion by putting a person on antimalarial treatment—not big doses of quinine, because that is not always good. If any of you have lived in a malarial region, you know that accompanying the malaria there is a sense of depression and a sense of good-for-nothingness—a patient not being absolutely sick—certainly not reasonably well. I take the liberty to suggest in such connection a remedy which, when you are feeling your way for a diagnosis, may do some good in way of helping both you and the patient. I know of but few instances in which malaria has not yielded to this prescription:

R. Cinchonæ rubra pulv....... .... ℥ i
Serpentariæ virg .... ℥ ss M.

To be put into one and a half pints of water, simmered into one pint, strained when cold, and one pint of Lisbon wine added. The dose is two tablespoonfuls three times a day; best taken just before meals.

THE DENTAL AND SURGICAL MICROCOSM.

A QUARTERLY MAGAZINE.

CONTROLLING EDITOR, - - - - - - SAMUEL J. HAYES.
ASSOCIATE EDITOR, - - - - - FREDERICK GAERTNER.

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EDITORIAL.

The readers of THE DENTAL AND SURGICAL MICROCOSM have been highly favored with the very instructive communication from Prof. Chisolm, of the University of Maryland, found in Nos. 3 and 4, on chloroform and its use in comparison with other narcotics for the purpose of producing anæsthesia.

The earnest student will find much to interest and profit by, while he may not agree with the Doctor in all his statements. From the Professor's extensive experience and observations in the use of chloroform, ether, etc., he has certainly brought forth and developed much that may be of interest and of very great help to others in securing like results. If we should say that Doctor Chisolm was fortunate in not having any fatal results in his thousands of administrations of chloroform narcotized air, we would do both the Doctor and his anæsthetic very great injustice. But if we say that he was very careful and skillful in both making and administering the anæsthetic, we evidently would state the facts. And yet there may have been favoring circumstances in the character of his patients. For we confess we cannot understand how anyone can make and positively administer certainly any anæsthetic by use of the cone, napkin or wire gauze, which are so frequently used, so that if they should happen to have an extremely delicate, nervously constituted patient, he may not by an over percentage of the drug, thrust into the patient suddenly, produce by its *chemical action* on the tens of thousands of nerve fillaments spread out over about 1,400 square feet of surface in the lungs of an ordinary sized man, produce a shock, or concussion and revulsion of the neural current and thus paralyze the nerve centre. For with such instruments, we know that the heaviest evaporation is always obtained first and usually first administered, and therefore, may cause a death by shock.

Hence, as the chief aim of this journal is to advance the science of anæsthėsia and surgery in their cooperative relations, we here take the liberty of pointing out what we recognize as fundamental errors in the article in question and detrimental in the development of the art and science of anæsthesia, and also which might lead others into still greater fallacies.

In so doing, our first criticism will be on the wording of the Doctor's chosen theme—"Chloroform the best of anæsthetics."

Teachers of any science should be careful in selecting words that they convey in their use the precise meaning that is intended. If chloroform is an anæsthetic, then it alone, and without the addition of any other chemical element, when applied, will produce anæsthesia. But if this chemical compound of itself cannot produce that precise physical condition that should be properly named anæsthesia—"a physical condition in which the force and functions of life are in continuance under modification whereby an absence of sensation is obtained"—ordinarily by the action of medico-chemical agents, then, I submit to your intelligence, it cannot be an anæsthetic. If an anæsthetic, then it will and must of necessity, when applied, produce anæsthésia. But if not an anæsthetic then it cannot produce that physical condition. Can you continue the force and functions of life while administering chloroform, without at the same time having sufficient free oxygen added by the admission of pure air to support combustion and sustain life?

Now while it is true that chloroform is mostly called an anæsthetic by so-called authority, yet it is none the less true, that it is a perversion and misrepresentation which has led to very many grave consequences. Chloroformed, or narcotized air may be an anæsthetic, but never chloroform. Chloroform may produce paralysis of nerve centre by its chemical action, or it may produce asphyxia by robbing the blood of the necessary oxygen to sustain life, but of itself it can never produce anæsthesia.

Hence, may we not here venture to challenge the Professor, or the scientific and literary world to prove that chloroform is an anæsthetic? Our columns are open for and we invite the proof. But if we admit that chloroform, ether, etc., are not anæsthetics, then the literary and scientific men who are the moulders and promoters of thought and reform, should drop the use as such, and instead thereof, use chloroformed air, etherized air, etc., as the pure atmospheric air is the all-important element in the anæsthetic. In fact, we can produce anæsthesia with the pure air alone. But we believe with the Doctor that chloroformed air, when properly prepared and administered, is far superior to etherized air in producing anæsthesia.

Again, we take exception to the admission that there is danger in producing anæsthesia with either, properly chloroformed air, or with properly etherized air. The danger lies in not having made and administered a true anæsthetic. Chloroform narcotized air may be an anæsthetic; but it may also be an asphyxiating agent, or a paralyzing agent. If in the attempt to make and administer the anæsthetic, the atmosphere be overloaded with the chloroform so as to crowd out the necessary quantity of free oxygen to supply in due quantum the red corpuscles of the blood, support combustion and sustain life, then it is not an anæsthetic, but an asphyxiating agent. And if an asphyxiating agent, then sooner or later, if continuously administered, it will produce asphyxia, and if still further administered, it will produce death ; and to this statement no exception can be taken.

Again, if an over percentage of the chloroform be suddenly introduced, as previously stated, you may have a paralyzing agent. But while it may be a paralyzing agent to one whose nervous system is extremely delicately constituted, it may not be to hundreds of others. Yet it is nevertheless a paralyzing agent to that one. Hence the danger lies in not making a true anæsthetic and not in the anæsthetic. For if a true anæsthetic all the time, you cannot fail to get anæsthesia. This is the *vital point* and the all-important element in securing safety in producing this much desired physicial condition for painless operations. And what we have here stated of chloroform, is true of ether, chlorolene, Hayes' Hypnotic, or any other suitable narcotic preparation. The only device that we are aware of for producing this much desired result absolutely safely, is what is known as "Hayes' Process of, and Apparatus for generating and applying anæsthetics." By this Process the anæsthetic is in point of fact generated and administered simultaneously, in such a manner as to preclude the possibility of having either an asphyxiating agent, or a paralyzing agent. That the reader may know how this is accomplished, we refer him to a description of this process in the latter part of this number of the D. and S. Microcosm.

Then again, we do not agree with the Doctor that chloroform is the best of suitable narcotics as the subordinate element in producing anæsthesia. While we contend that it is not dangerous when properly applied, and far superior to ether, yet we know that what is known as Hayes' hypnotic is far superior, especially for minor operations, as it is more vascilating and will pass on and off more rapidly, and leave your patient in a much better condition.

The Doctor's habit of giving a drink of wiskey previous to the administration of the anæsthetic, may be of service if given to patients immediately preceding the administration, when necessary to stimulate the neural current, and thereby sustain the action of the heart, but if applied over twenty minutes before administration, it would most assuredly do harm rather than benefit.

Again, the *causes* that so frequently produce death accompanying the administration, are clearly delineated by the Professor and by him admitted not to be legitimate causes, but causes due to maladministration and improper handling of the patient, except as to the seventh or last cause, which he says is "*the only legitimate and rarest of all causes of death from anæsthesia*." This cause he is pleased to designate as "that unknown condition called idiosyncrasy, in which anæsthetics show themselves poisons of extreme activity, and at some stage of the administration kills promptly." Precisely what our learned friend designs to assign as the cause of death, and the "only legitimate cause," by this peculiar mystic phraseology, we are at a loss to know. Webster defines idiosyncrasy—a peculiarity of constitution. But if peculiarity of constitution is the cause of the death, in the cases referred to, as the Doctor alleges, then peculiarity of constitution kills the patient and not the anæsthetic. Therefore, this last and "only legitimate cause," as the Professor claims, cannot be put upon the anæsthetic.

What (seriously) can the Doctor mean, when he refers to "idiosyncrasy" as the only legitimate and rarest of all causes of death from anæsthetics?" Will the good Doctor kindly tell us what this "idiosyncrasy" *might* be, that would or *could* be the cause of death?

He very truthfully tells us that "the effects of anæsthetics depend on the immediate influences exerted by the drug upon the sensitive elements of the nerve centres, in virtue of which their properties are temporarily suspended." Then in immediate connection with this intelligent statement, he says, "in cases of idiosyncrasy these functions, so essential to life, become permanently suppressed." May this not be the case with any one whose nervous system, is extremely delicately constituted? Would it not likely be the case with such patients, if an overvolume of electricity were let into the patient through the sensory nerves (the only channel) to the nerve centre? But the Doctor states further that "with the death of the individual, the changes in these nerve elements are of such a nature that, so far, they have altogether escaped detection, by pathological investigators."

We are anxious to assist the Professor out of this dilemma, though it may expose us to the charge of being too presumptuous.

If it be true [illegible] the axiom) that there is never a *result* without a *cause*, then the heart and the lungs will continue to perform their respective functions (the functions of life) normally, as long as the cause or force that impels these functions is in normal relation and continuous. Then let us inquire whence cometh that force and through what channel is it communicated? It will not answer to say that life is that force and that we do not know what life is. *Life* is not *force*, neither is *force*, *life*. But *force* may make *life* manifest. Then it is properly called vital force.

We believe that it is admitted by scientists, that all material force is a unit; that its different forms are only its correlations convertible into each other, heat into light and light into heat; electricity into neural force and neural force into electricity, etc. The basic element out of which electricity or neural force is generated is free oxygen. That free oxygen is conveyed to the brain of every animal through arterial and venous circulation. But that arterial and venous circulation is dependent on the force conveyed and made manifest through the motor nerves, from the great heart of the nervous system—the brain

—which is a collection or mass of cells forming a galvanic battery, which generates animo-electricity from the basic element, free oxygen supplied by the blood. As rapidly as it is generated, it is sent out at the behest of life by spirit force or mental force, and this animo-electricity thus sent out through the motor nerves in sufficient volume, impels all the organs to perform their respective functions, and this same electricity returns to the brain through the sensory nerves, and thus all sensations and impressions, are communicated to the spirit or mind, that poses as the governor and presides over and directs material force, by operating on the cells of the brain, and sending out thus the necessary volume of animo-electricity to move and make operative the precise organ at will. Thus the spirit or mind will conceive of a tune and by spirit force operate upon material force (as above described), move the physical man to the piano and cause his fingers to execute the tune as conceived by this mind and at the instance of his will; thus sending the electricity out in the precise motor nerve, or nerves, that is necessary to move the special muscles to operate, and the tune is executed and the evidence may be brought back to that same spirit or mind through the sensory nerves, by the same electric current, though in less force. Says one, this is only fine-spun theory! We beg your pardon; it is simply pointing out causes of results. If we have not designated the true cause or causes of these results, will *you* kindly direct us to any more certain cause or causes of these functions and results? But we submit to the intelligence of the reader as to the truths here set forth.

Then if this be true, how can any idiosyncrasy, or peculiarity of constitution interfere or be the cause of interfering with the functions of life? The only *possible way* that an anæsthetic or any other drug or force can prevent the organs of life from performing their respective functions, is to affect or interrupt the neural currents in the motor nerves leading into these organs. This can only be accomplished by the chemical action of the drug (by an over-percentage suddenly introduced into the lungs as before stated), or by robbing the blood of the necessary free oxygen to support combustion and sustain life, as heretofore explained. Therefore, if the anæsthetic be generated and applied as by "Hayes' Process of, and Apparatus for generating and applying anæsthetics," all danger to life from the anæsthetic *per se* is expelled.

In proof of this, we might here state that over 250,000 patients have been anæsthetized by this Process, etc., without a single death. Then take into consideration the number of times anæsthesia has been produced by those who have exercised great care in the preparation and administration in the use of chloroform, as stated by Prof. Chisolm in his own experience, as well as that of others quoted, and as by the use of ether, and you have strong evidence that if a true anæsthetic, is generated and administered as described and done by the Hayes' Process, you eliminate the danger and always have safety in the administration. If a death should ever occur during the operation or administration, it must be due to some other cause consequent upon malpractice.

The Death From Chloroform, or chloroformed air, as reported in this number, page 244, is only another warning against the use of any instrument, appliance or inhaler by which you cannot definitely determine the percentage, or pro-rata, of the narcotic element in the anæsthetic and adapt it to the kindly tolerance of the patient in all the stages of anæsthesia.

The reader and student is always anxious to know the cause of the result, and especially when the result is death. In search of the cause in this case note first the physical condition of the patient at the time and as set forth in the autopsy and microscopical examinations.

"The heart was perfectly normal in appearance, as was the right lung. There was some apparently recent congestion of the lower lobe of the left lung, which, however, was not apparent on physical examination of the chest before death. There was evidence of a recent mild peritonitis. The liver was unduly hard and friable. Both kidneys were a little larger than normal and somewhat congested, and were quite friable."

The only vital organs not found in a normal condition were the kidneys and liver. Their condition absolutely forbid the crowding in of any anæsthetic. The lack of ability to eliminate, consequent upon this friable and congested condition, would hasten asphyxia. Then the administration of the supposed anæsthetic by a cone, and the second application of the chloroform in the cone, after which the patient took but three or four inhalations, when the patient ceased to breathe and "collapsed," all point to the true cause, *died for want of free oxygen to sustain life.*

Then the fact that the lungs ceased to perform their functions first, is strong evidence that the patient was not only asphyxiated, but too profoundly asphyxiated to be resuscitated.

Had the anæsthetic been properly generated and applied, as by Hayes' Process and Apparatus, no such result could have occurred.

DEATH OF DR. AGNEW.

This eminent surgeon and physician had been the victim of influenza or *La Grippe* for some months past, but still persisted in continuance at his professional duties until two days before his death, when the earlier symptoms of bronchial and throat troubles were complicated by an affection of the kidneys and heart, to which he had been subject for several years, and to this combination of afflictions the professor's rugged constitution was finally forced to yield.

Dr. Agnew, one of the most widely known and eminent surgeons in the United States, was born in Lancaster county on November 24, 1818. He studied at Moscow Academy, Chester county, Jefferson College, Canonsburg, and at Newark College, Delaware. His father was a physician, and he followed his footsteps, graduating from the Medical Department of the University of Pennsylvania in 1838. He located in Philadelphia, and became successively instructor in the School of Anatomy, surgeon to the Philadelphia Hospital, Demonstrator of Anatomy at his *alma mater*, surgeon at the Pennsylvania Hospital and Professor of Clinical Surgery in the University of Pennsylvania. He has been President of the State Medical Society and the American Surgical Association. His works on the practice and principles of surgery are text-books in the medical profession. He was a master in every branch of surgery, and the skillfulness of his operations, and the scholarly character of his literary contributions have made his fame world wide.

Dr. D. Hayes Agnew, of Philadelphia, for more than a generation has stood in the front ranks of his profession and achieved the honored rank of one of the most eminent and skillful surgeons in the world. Though in his death America has suffered an inestimable loss, yet he lives, and will continue to live, in the literature of his chosen profession for generations to come.

DEATH FROM NITROUS OXIDE GAS.

Just as we were going to press with our last number of this journal, December 30, 1891, the sad death of Mr. Bernard Mohan occurred in the dental chair of Dr. W. S. Yates, at No. 802 Penn avenue, Pittsburgh, from the use of what the Doctor has seen fit to call "vitalized air"—and claims, in common with many others, to be the original inventor—which is, in point of fact, simply nitrous oxide gas, or this gas with a little chloroform added, which only makes it doubly devitalizing. We only gave the announcement of the death as given by one of the city papers. The coroner's inquest and report from the physicians who conducted the *post-mortem* examination were not yet given, as the inquest had not yet then been held.

We now desire to state briefly the result of the *post-mortem* examination conducted by Drs. J. G. McCandless, Adolf Koenig, John Dickson and A. F. Gentry, with Dr. W. S. Yates in attendance. The body was found to be in excellent condition. Not an organ indicated the least weakness. The lungs and heart were in normal condition and the physicians stated that the patient died from exhaustion, and that they could not state the cause of the death. But if the patient died from exhaustion, (and they so stated), then they did tell the cause of the death. If from exhaustion, then exhaustion of what? It *absolutely* could not have been from exhaustion of anything else than the exhaustion of the *oxygen* in the blood, which was brought about by the administration of the nitrous oxide gas, to the exclusion of atmospheric air, by which the deoxidation of the blood and the death were produced. The editor of this journal having been subpœnaed to appear before the coroner's jury in this case, to give expert testimony, confesses that he was no little surprised at the combined effrontery, artifice, or strategy, displayed in the united efforts of the gas dealers and their "vitalized air" patrons, in their efforts to make it appear that their "vitalized air" was not the cause of the death. But it was also shown that the dentist was cautious in his administration, on which account it was held by the jury that he was not to blame for the sad death. If then the administration was not at fault, and if the man's physical condition was normal, all the vital organs in perfect normal condition, and if the nitrous oxide gas was not the cause of the death, then the man died without any cause, a result without a cause—*a reductio ad absurdum.*

As further evidence of this *combined effort* to force upon an unsuspecting public the use of nitrous oxide gas, whose whole mission is to devitalize, to lower neural energy, and whose tendency, the use of which, is to insanity and death; we refer to the *fact* that not one of the dental journals published by the dental depots or dealers in nitrous oxide gas and gas apparatuses, will publish a death or case of insanity resulting from the use of nitrous oxide gas, or so-called "vitalized air," or "vegetable vapor" (the latter expressions being used to *mislead* and popularize nitrous oxide gas), if they can possibly and plausibly avoid it. The above death occurred on December 30th, 1891. The facts of the death, etc., were given in our January number, and our exchanges have had that number sent to them, yet we have failed to see any reference to this sad death whatever. The local press is also ofttimes sudsidized to their combined interests, as was largely the case in this instance. Then note the fact, that all except one of the dental journals is either published by, or in the interest of these dealers.

They, too, have their personal friends in the profession who use their influence and opportunities to aid them in their work. And when it is necessary to summon their *combined* force (through their combination) to protect or to popularize their golden egg, they have the audacity and sophistry to do it, regardless of life and health. We might refer to many other deaths and cases of insanity consequent upon the administration of nitrous oxide gas or its *nom de plumes*, which have never appeared in any of these journals. Whoever saw in any of these dental journals the announcement of the death of James Creswell in the office of Dr. Thomas, of Philadelphia, and of that in Dr. Eubank's office in Birmingham, Ala., and many others of no distant date ?

In consequence of the editor's testimony before the coroner's jury in expressing the true character and effects of this nitrous oxide gas, or so-called "vitalized air," the most *virulent* attacks were made by the most irresponsible and unrepresentative men of the profession. One especially, whose character is such that it would be most humiliating to any gentleman to make reply to his personal attacks. But on account of the gross misrepresentation and injustice both by the advocates of this so-called "vitalized air" and the subsidized press, we were constrained to make the following brief general statement, published in the *Leader*, of Pittsburg, from which we clip the article:

THE VITALIZED AIR ISSUE.

DR. HAYES REPLIES TO HIS CRITICS AND CITES AUTHORITIES TO SUSTAIN HIS POSITION.

Dr. S. J. Hayes, who has taken ground against the use of vitalized air, or nitrous oxide, or laughing-gas, as it is variously called, in the practice of dental surgery, comes back at his critics in the following communication:

EDITOR LEADER:—The recent shaking up of the "vitalized air" advocates by our condemnation of the deceptive and humbugging name, as well as its death-dealing mission, has flooded the city papers with numerous and various flippant, arrogant, erratic and false statements, culminating in vile, malicious personal vilifications, coming mostly from the non-representative men of the dental profession (be it said to the honor of the profession) to which I am asked to make reply, and to which I consent with reluctance, knowing full well the consummate arrogance and unhesitating mendacity of most of these advocates. But in justice not only to the science and the profession, but for the benefit of the public and in justification of my position, I am impelled to write a few facts, through the editor's kind indulgence. In so doing I wish it distinctly understood that I am not responsible for much that the papers of the city have reported me as saying, connected with the recent sad death in Dr. W. S. Yates' office. I have never said that all who use nitrous oxide gas are quacks. But I have said that calling nitrous oxide gas with a little chloroform or ether "vitalized air" savors of quackery, as it is, in point of fact, a devitalizing agent and an entire misrepresentation of its character. Neither have I said that nitrous oxide gas "is a narcotic producing exciting, sedative soporific or iodide effects, according to the stage of administration;" but I have said that of chloroform. Nothing can be gained by misrepresentation or personal abuse in the discussion of a subject of such grave importance to the public. Life is not to be trifled with, nor to be made subordinate or subject to nor dependent upon the result of any man's business or combination of business interests. Hence, it should be the mission of the press to afford every facility for investigation and the enlightenment of the people as to the real cause of the death and as to the true character of the agent employed.

I have no time nor disposition to answer malicious personal attacks and falsifications, nor to parade before an intelligent public a D. D. S. or M. D., as they are ofttimes only the synonym of puffed up ignorance, preferring that they judge of the character of the men by the character of their articles. The all-important question to the public, who are to be relieved from suffering in the extraction of teeth or any other surgical operation, is, what is the character, effects and tendency of this agency that is called "vitalized air," or nitrous oxide gas? This is answered in the following editorial review of THE DENTAL AND SURGICAL MICROCOSM of January, 1892, of a paper produced in advocacy of nitrous oxide gas.

This review is too lengthy to be reproduced here, but can be had (by those interested, by addressing Hayes Dental and Surgical Manufacturing Company, 804 Penn avenue, Pittsburgh, Pa.) which completely and thoroughly places nitrous oxide gas in its true character before the reader.

While busily writing the above, we received a letter (containing subscription for THE D. & S. MICROCOSM) from Dr. J. H. Pelton, of Middletown, Conn., whose acquaintance we do not have the pleasure of, from which we take the following: "I am 70 years of age; over 40 years ago, I commenced the use of ether when it was first discovered and used it about 12 years for the painless extraction of teeth. Then I used chloroform for awhile, when, in 1872, I used the compressed nitrous oxide gas for 12 years. Since then I have used alcohol, chloroform and ether combined, in various proportions, A. C. E. one, two, one and one, two, three. I am remarkably well pleased with your journal. I find your description of the science of anæsthesia, etc., very correct. I have administered anæsthetics to more than 5,000 persons, and of course with all that experience, observations and reading all I could get on the subject, makes me something of an expert. Your articles on anæsthesia and asphyxia are very valuable. I have seen asphyxia all I want in my practice. The giving of anæsthetics is a very important matter and but little understood. The patient's clothing should be loose for easy respiration. The patient should be quiet, without fear, peaceful and at rest. No one should have teeth extracted that can be saved, because it can be done without pain. The sacrifice of human teeth that can be saved, is a crime on the part of both dentist and patient."

POWER OF MENTAL IMPRESSIONS

In 1862 Mr. Woodhouse Braine was called upon to give chloroform to a nervous, hysterical girl, for the purpose of having two tumors removed from the scalp. In order to accustom her to breathing through the inhaler before giving her chloroform, he placed it over her face and she at once began to breathe rapidly through it. In half a minute she said, "Oh, I feel it, I feel I am going off." Immediately after she was found to be insensible to pinching and her muscles were flaccid. Both tumors were removed without her having taken a drop of chloroform, and after the operation she declared she had not felt a particle of pain. The doctor very facetiously adds: "To the time she left the hospital she firmly believed in the potency of the anæsthetic which had been administered." ("Influence of the mind upon the body," Tuke.)

The above clipped from the Dental Ofin and Labratory demonstrates not only the influence of the mind upon the nerval circulation and the entire nervous system, but also what can be the effect of rapid breathing. The anæsthesia, or hypnotism produced was undoubtedly obtained both by the influence of the mind and the super-oxygenation of the blood by the rapid breathing.

THE Dental Department of the University of Maryland graduated 73 at their late Commencement. Dr. Harry VanTassel, of Yankton, South Dakota, carried off the University prize.

NOW is the time to subscribe for THE DENTAL AND SURGICAL MICROCOSM, Vol. II. You will be certain of getting all the numbers of the volume. Many of the late subscribers for first volume are now wanting No. 2. Any persons willing to spare No. 2 of Vol. I. will please send it to the publisher and receive pay for the same.

THE D. AND S. MICROCOSM.

Subscribe for The Dental and Surgical Microcosm. Commence with our next issue, which is the first number of the second volume. The same vigorous efforts will be continued to make the journal first class in every respect as has characterized this publication from its first appearance. As this is the only journal (so far as we know) chiefly devoted to the science of anæsthesia, anæsthetics and surgery in their co-operative relations. No dentist nor physician who would administer an anæsthetic of any kind can afford to be without The Dental and Surgical Microcosm. Its aim is to teach the science of producing anæsthesia. How to obtain that much desired physical condition without endangering life. In this you have the most advanced thoughts of the most learned, scientific and experienced in both the medical and dental professions, not only in this country but throughout the world. And these thoughts most fearlessly and justly criticised and commented on by the Editorial Staff. Therefore, no one who uses anæsthetics of any kind, can afford to be without this journal, as it teaches, in a practical way, the fundamental principles of the science.

"The *Dentist Himself*" recently visited our sanctum, and if we had not looked up his character, we would really not have taken him to be *Himself*. However, Dr. J. A. Kimball, of No. 28 West Twenty-Sixth street, New York, vouches for his character and well-appearing. As the Doctor is quite intimately related to the *Dentist Himself*, he will no doubt keep him in his line of duty as he is fully competent to the task. May the aroma from the ambrosial Tree of Life, wafted by the gentle breezes of heaven, descend upon both Dr. Kimball and the *Dentist Himself*. Come again, *Dentist Himself*.

Dental Questions and Answers is the title of a neat little book edited by Dr. Gustavus North, of Springville, Iowa., who is lecturer to the American Dental College of Chicago. These questions and answers are the outlines of about 50 lectures delivered on dental pathology, therapeutics, dental embryology, hygiene and care of children's teeth, and as it has been prepared especially for young students, the questions are generally easy, plain and of a practical character.

QUESTIONS ANSWERED.

The following questions have been asked by many, and to save time in writing to each one separately, we append the answers as follows:

"I have been very much interested in your journal; you throw much new light on the science of anæsthesia and I like the features of your process; but why not sell your apparatus straight out? I prefer to own the apparatus rather than to lease it."

We have patents on the process of generating and applying anæsthetics, which are of infinite value; also patents on the apparatus adapted to the use of this process. There is no *possible* way by which any monied consideration for use of a patented process can be obtained only as by selling licenses for use of same. Thus the process of making Bessemer steel is leased to the furnaces making the same, etc. If we leased the process and sold the apparatus, that might give rise to the question of the legal status of the process and apparatus in their respective use, separate or combined. And as we do not wish to encourage litigation, we lease both process and apparatus during life of the patents, and provide for the sale of the apparatus at the nominal price of $10. We do business somewhat after the manner of the telephone companies. And surely it cannot matter to the purchaser whether he pays royalty on a patented appliance or mechanism, a copyrighted book, or in the shape of a license. It is all royalty, and the difference can only exist in imagination.

"Which owns the patents for Hayes' Process of and Apparatus for Generating and Applying Anæsthetics? The Hayes Anæsthetic Company, or the Hayes Dental and Surgical Manufacturing Company?"

The Hayes Dental and Surgical Manufacturing Company own the Patents and transact all business connected therewith, and have the exclusive agency for the sale of Hayes' Hypnotic, Hayes' Chlorolene, and also sell chloroform and ether of the best quality.

The Hayes Anæsthetic Company make Hayes' Hypnotic and Chlorolene.

"Do you give the formulas for Hayes' Hypnotic and Chlorolene?"

We do not possess the formulas and therefore cannot give them. The Hayes Anæsthetic Company do not give the formulas for the same financial reason that Squibbs does not give his formula for making his chloroform. The *facts* are that the *formula* or chemical symbols of any drug, does not help a man to a knowledge of the drug. A fundamental law of chemistry is that when any two or more chemical elements are chemically combined they lose the properties and effects of any and all of the elements. This is seen in the five different chemical combinations of N. & O. as N. ^{2} O-Nitrous Oxide, N. O. ^{5} -Nitric acid, crystal form, etc.

The only knowledge afforded in chemical formulas (and this is given with Hypnotic and Chlorolene) is the relative quantity of either element required to form the chemical union or combination. But when they are once combined they have lost all their individual properties and effects as any chemist knows, and a new product is formed having entirely different properties and effects. Therefore, there is absolutely only one way of coming to a correct knowledge of any drug, and that is by experiencing the effects or by witnessing the manifestations of the experience of another person or animal or receiving the statements of those who have come to a knowledge thus. Respectfully,

HAYES DENTAL & SURGICAL MANUFACTURING CO.

DEATHS.

DR. D. HAYES AGNEW died March 22d, 1892, at 3:00 o'clock P. M., at his residence, No. 1601 Walnut street, Philadelphia. (See editorial.)

THE sad death of Harold W. Morse, a prominent student of the American Dental College of Chicago, from Napesville, Ill., died of typhoid fever January 22d, 1892.

DR. JAMES M. STEWART, a prominent dentist, died at Clearfield, Pa., at his home of cancer of the stomach; aged 54 years. He leaves a wife and son to mourn their loss.

DR. CHARLES P. PENGRA died at his home, No. 130 Dartmouth street, Boston, Mass., at one o'clock A. M., January 31, 1892, aged thirty-one.

Prof. Pengra, though young, had attained a position in his profession and a standing in the Boston Dental College as a teacher of Histology and Microscopy equaled by few. He was an original, thorough investigator, and possessed a rare faculty of interesting his students. The college has lost an able instructor and a most efficient worker.

THE recent death of Dr. C. C. Thomas, dentist, of Houston, Texas, was a great loss to his profession, having spent forty years in active practice and in the front ranks of his profession.

THE following resolution was passed at the last meeting of the Board of Directors of the Philadelphia County Dental Society:

WHEREAS, It has pleased our Heavenly Father to call to rest Dr. Charles A. Kingsbury, our friend, associate, active member and one of the founders of this society, therefore, be it

Resolved, That we desire to express our high esteem for one whose faithful and earnest work is widely known throughout the profession; and

Resolved, That this record of our deep regret be entered on the minutes of this society, and a copy of these resolutions be sent to the dental journals for publication. *L. Ashley Faught, Secretary.*

MY EXPERIENCE WITH COPPER AMALGAM.

I find by looking back in my register, that I first began the use of copper amalgam about January 1st, 1889. I have kept a record of every filling put in, and find I inserted about one hundred, when I discontinued its use as unreliable. I was first induced to begin its use on account of its being highly recommended by many reliable practitioners and dental societies, to fill a long-felt want. It was specially recommended for filling sensitive cavities, cavities in soft teeth, shallow buccal cavities, large approximal cavities in molars, labial cavities extending below gum lines; and particularly in filling in close proximity to the pulp. This was the filling I had been looking for ever since I began practice.

My motto in doing all kinds of work is, that whatever is worth doing, is worth doing well; and I took just as much pains in preparing and filling with this material, as though it were gold. I have tried grinding it a little, and grinding hard; mixing and squeezing dry, and working soft; heating it a little till the sweat just started, and heating till it perspired like a ladle carried in a stove foundry. There is little, if any, difference in the fillings; they were all failures as far as I have been able to discover, and a greater part of them have been replaced with something more reliable. I shall not attempt to offer any scientific explanations or theories, as I believe that practical facts are what we want. The fact that one hundred of these fillings put in during one year should fail, and need to be replaced, in from six to fifteen months after being inserted, should convince anyone that copper amalgam is unworthy the confidence of the profession.

I beg leave to differ a little with the *Ohio Journal* regarding their interpretation of the copper amalgam squeak. Although only acquainted with the animal a short time, I should translate it: Keep me out! Don't put me in! I am a total failure in all mouths!—DR. WILLIAM H. STEELE, Forest City, Iowa, in *Items of Interest*.

NOTICES.

MICHIGAN STATE BOARD OF EXAMINERS.—The annual meeting of the State Board of Examiners in Dentistry convened in the Senate chamber this afternoon for the purpose of the examination of the applicants for a license to practice dentistry in this State. The last Legislature made the College of Dental Surgery of the University of Michigan, the standard of comparison in the examinations of this board. No diplomas are recognized from any institution whose requirements for graduation are not up to that of the University, and a resolution to that effect was adopted with reference to the applications of parties graduating from colleges whose requirements were below the standard at the present meeting. The fee for examination is ten dollars, and for registration without examination, for those holding diplomas from recognized colleges, three dollars.

The board consists of three members, all officers, and the doctrine of evolution is enforced by law in the organization. One member is appointed each year for the term of three years, and he, by law, becomes secretary of the board; the second year he becomes the treasurer, and the last year the president, and should he be reappointed he takes his place at the foot again. The present organization of the board is, President, A. T. Metcalf, Kalamazoo; Treasurer, H. K. Lathrop, Jr., Detroit; Secretary, G. E. Corbin, St. Johns.—*Detroit Free Press.*

LANSING, October 28.

THE Post-Graduate Dental Association of the United States will hold its annual meeting April 29th and 30th, next, at the Leland Hotel, Chicago.

Dr. W. C. Barrett, of Buffalo, N. Y., Drs. T. W. Brophy, Louis Ottofy, and others, of Chicago, will present essays and addresses. An interesting programme has been arranged and a good attendance is expected. All members of the profession are invited.

Graduates of recognized Dental Colleges may become members, by paying membership fee, one dollar, and dues for one year in advance, one dollar.

96 STATE ST., CHICAGO. F. S. TENNEY, *Secretary.*

THE Missouri Dental College is now the Dental Department of the Washington University, St. Louis, Mo. A new building will be erected for the Medical and Dental Departments, to be ready for occupancy by the opening of the session of 1892-93, and will be one of the best equipped buildings for the purpose in the United States.

ST. LOUIS DENTAL SOCIETY.—The St. Louis Dental Society met at the residence of Dr. Conrad, on January 5, 1892, and elected the following officers for the ensuing year:

President, Dr. George Robitoy; Vice-President, Dr. Walter M. Bartlett; Recording Secretary, Dr. J. B. Vernon; Corresponding Secretary, Dr. John G. Harper; Treasurer, Dr. Henry Fisher.

Committee on Publication.—Drs. Helmuth, Lindsley, and Keith.

Committee on Membership.—Drs. Morrison, Hickman, and Spaulding.

Committee on Ethics.—Drs. Baird, Prosser, and McNamara.

The Executive Committee consists of the officers of the Society.

Regular meetings are held on the first Tuesday of each month, excepting July, August, and September. JOHN G. HARPER,
800 PINE ST., ST. LOUIS. *Corresponding Secretary.*

THE Twenty-first Annual Meeting of the Kanas State Dental Association will be held at Ft. Scott, April 26, 27, 28 and 29, 1892. Members of the profession are cordially invited to meet with us. C. E. ESTERLY, *Secretary.*

DIRECTORY OF DENTAL SOCIETIES.

American Dental Association—Meets on the first Tuesday of August, 1892, at Niagara Falls. Pres., W. W. Walker, Rec. Sec., Geo. H. Cushing, Chicago.

Southern Dental Association—Meets at hotel on Lookout Mountain, Tenn., last Tuesday in July, 1892. Pres., Gordon White, Nashville ; Sec'y, M. C. Marshall, Little Rock, Ark.

STATE DENTAL SOCIETIES.

Alabama Dental Association—Meets annually. Next meeting at Montgomery, on the second Tuesday of April, 1892. Pres., Geo. Eubank, Birmingham ; Sec., J. H. Allen, Birmingham.

California State Dental Association—Third Tuesdsy in July, 1892. Pres., Thos. Morffew ; Rec. Sec., W. A. Knowles, San Francisco ; Cor. Sec., L. Van Orden. Next meeting in San Francisco.

Colorado State Dental Society—Meets second Tuesday in June, 1892. Pres., R. B. Weiser, Georgetown, Colorado ; Sec., C. Conert, Denver. Next meeting will be held at Colorado Springs.

Connecticut State Dental Society—Pres., E. A. Stebbins, Shelburne Falls ; Rec. Sec., Geo. A. Maxfield, Holyoke. Annual meeting October 27th and 28th, 1892, at Hartford.

Dental Society of the State of Maryland and District of Columbia—Meets annually. Next meeting at Washington City, on the second Tuesday in October, 1892. Pres., B. F. Coy, of Baltimore; Sec., M. W. Foster, Baltimore, Md.

Georgia State Dental Society—Meets second Tuesday in July, 1892, at Rome. Pres., W. G. Browne; Rec. Sec., S. H. McKee; Cor. Sec., L. D. Carpenter, Atlanta.

Illinois State Dental Society—Meets at Springfield, second Tuesday in May, 1892. Pres., T. W. Pritchett, Chicago; Sec., G. Newkirk, Chicago.

Indiana State Dental Society—Meets next at Maxinkukee, on the last Tuesday of June, 1892. Pres., E. J. Church, La Porte, Ind.; G. E. Hunt, Indianapolis.

Iowa State Dental Society—Meets annually. Next meeting in Ottumwa, on the first Tuesday in May, 1892. Pres., S. E. Hatch, Sioux City; Rec. Sec., G. W. Miller, Des Moines.

Kentucky State Dental Association—Meets annually, first Tuesday in June, 1892. Next meeting in Louisville. Pres., H. B. Tileston, Louisville; Sec., J. H. Baldwin, Louisville.

Kansas State Dental Association—Pres., F. O. Hetrich, Ottawa; Sec., C. E. Esterly, of Lawrence. Next meeting will be held at Ft. Scott, April 26th, 1892.

Maine Dental Society—Pres., G. W. Stoddard; Sec., C. E. Bryant, Pittsfield. Meets on the third Tuesday in July, 1892. Place of meeting not decided.

Maryland State Dental Association—Meets annually in December. Pres., J. Emory Scott; Rec. Sec., W. W. Dunbracco; Cor. Sec.

Massachusetts Dental Society—Meets Semi-Annually in Boston, June 5th, 6th and 7th, 1892. Pres., Geo. F. Eames, Boston; Rec. Sec., E. O. Kinsman, Cambridge.

Michigan State Dental Association—Meets annually. Next meeting at Saginaw, Tuesday, June 7th, 1892. Pres., H. C. Corns, Detroit; Sec., J. Ward House, Grand Rapids; Treas., Geo. H. Mosher, Jackson.

Mississippi State Dental Association—Meets first Tuesday in May, 1892, at Columbus, Miss. Pres., D. B. McHenry, Grenada; Sec., P. H. Wright, of Senatobia.

Minnesota State Society—Pres., W. C. Merrill, Albert Lee; Sec., L. D. Leoard, Minneapolis. Meets in Minneapolis, July 13th, 1892.

Missouri Dental Association—Meets at Clinton, Mo., July 5th to 9th, inclusive, 1892. Pres., Geo. L. Shepard, Sedalia; Sec., Wm. Conrad, St. Louis.

Nebraska State Dental Society—Meets annually. Next meeting third Tuesday in May, 1892, at Beatrice. Pres., J. J. Willey, Wahoo; Sec., C. R. Tefft, Lincoln.

New Jersey State Dental Society—Meets annually. Place and time of meeting to be decided later. Pres., B. F. Luckey, Paterson; Sec., C. A. Meeker, Newark.

New Hampshire Dental Society—Meets annually. Next meeting will be held in Concord, N. H., second Wednesday in June, 1892. Pres., W. R. Blackstone, Manchester; Sec., Burton C. Russell, Keene.

North Carolina State Dental Society—Meets in Morehead City, August 11, 1892. Pres., H. C. Hearing, Concord; Sec., C. A. Rominger, Reidsville.

North Dakota Dental Society—Meets July 26, 1892. Pres., S. P. Johnson, Grand Forks; Sec., S. J. Hill, Fargo.

Ohio State Dental Society—Meets annually. Next meeting at Columbus, first Tuesday of December, 1892. Pres. J. R. Callahan, Cincinnati; Sec., Otto Arnold, Columbus.

Pennsylvania State Dental Society—Time and place of meeting not yet decided. Pres., Louis Jack, Philadelphia; Cor. Sec., H. Newton Young, Wilkesbarre.

Rhode Island Dental Association—Pres., D. F. Keefe, Providence; Sec., W. H. Carpenter, Providence. Meets quarterly, second Tuesday in July, October, January and April. Annual meeting second Tuesday in July, at Providence.

South Carolina State Dental Association—Meets annually. Pres. J. T. Calvert, Spartanburg; Cor. Sec., A. T. Peete, Branchville. Next meeting at Rock Hill, S. C., third Tuesday in May, 1892.

Texas State Dental Association—Meets in Ft. Worth, fourth Tuesday in May, 1892. Pres., J. H. Grant, Austin; Sec., C. B. Lewis, Dallas.

Tennessee Dental Association—Meets annually. Next meeting at Chattanooga, first Tuesday in July, 1892. Pres., Wes. DeStubblefield, of Nashville; Rec. Sec., A. G. White, Springfield; Cor. Sec., P. D. Houston, of Louisburg.

The Dental Society of the State of New York—Meets annually on the second Wednesday in May. Next session at Albany, May 8, 1892. Pres., W. W. Walker, New York; Rec. Sec., F. T. Van Woert, Brooklyn; Cor. Sec., R. Ottolengui, New York.

Vermont State Dental Society—Meets annually. Next meeting at Burlington, third Wednesday in March, 1892. Pres., Dr. W. S. Curtis, West Randolph; Sec., Thos. Mound, Rutland.

Virginia State Dental Association—Meets in Charlottsville, Tuesday, August 19, 1892. Pres., J. Hall Moore; Sec., L. M. Cowarden, Richmond.

Wisconsin State Dental Society—Meets annually. Next meeting at Milwaukee, third Tuesday in July, 1892. Pres., E. C. French, Eau Claire; Sec., C. A. Southwell, Milwaukee.

West Virginia State Society—Meets at Wheeling, W. Va., January 7th, 1892. Pres., H. H. Harrison, Wheeling; Sec., Geo. I. Keener, Morgantown.

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ERROR.

Through an inadvertency of the printer, the second number of this volume was wrongly numbered, and should be renumbered by the binder in compiling this volume.

THE

Dental and Surgical Microcosm

Is a Quarterly Journal, devoted chiefly to the science
of Anæsthesia and Surgery in their
co-operative relations.

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THE controlling editor, DR. S. J. HAYES, who has devoted many years to the science of Anæsthesia and Anæsthetics, in their relations to surgery, will be assisted by some of the most learned in both the Medical and Dental professions in the United States and in Europe, and the JOURNAL will ever aim to be both progressive and aggressive: pre-eminently scientific and yet independent in all its literature and relations; belonging to no school of Dentists nor Physicians, but advocating advancement and a higher standing for all in their relations to science and art. In brief, it will ever aim to be worthy of its mission and a place in every Physician's and Dentist's library.

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Controlling Editor.

THE

DENTAL AND SURGICAL MICROCOSM.

VOL. 2. JULY, 1892. NO. 1

THE PAST, PRESENT AND FUTURE OF ANÆSTHESIA.*

BY PROF. B. J. CIGRAND, B. S., D. D. S.

One of the most important subjects that is engaging the attention of the medical and dental professions at the present time, and which is creating much interest and enthusiasm, is the science of Hypnotism or Anaesthesia. In order that we may clearly understand the subject, let us see if we all agree as to the meaning of the word Anæsthesia. Present time dictionaries and encyclopœdias tell us that it is a word of Greek origin and means "loss of consciousness, sensation or feeling;" and they furthermore harmonize that the term Anaesthesia in medical science describes a state of insensibility to external impressions, either the result of disease or induced artificially by the employment of certain agencies known as anaesthetics or hypnotics, and in which state the forces and functions of life continue under modifications. Under the head of Anaesthetics are mentioned: Chloroform, Ether, Nitrous Oxide, Narcotized Air, Alcohol, Chloral, Ethyl, Bromide, Ethidene. Anaesthetics are divided into two classes, namely, general and local. In the former complete insensibility is produced throughout the entire system, in the latter the immediate parts are only made insensible. In this paper, it will be my aim to briefly sketch the science and dwell succinctly on Mesmerism, Nitrous Oxide, Ether, Chloroform and Narcotized Air, since these Hypnotics are of modern consequence.

Now, having a fair idea of the subject matter, let us proceed to study the history, uses and advancement of this wonderful science.

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Although the science is generally supposed to be a modern discovery, on careful investigation we find on the contrary that it is ancient, and there is abundant evidence to show that the science of Anaesthezing is a practice of great antiquity. The most familiar instance of Anæsthesia is that produced by a an overdose of alcohol in the case of drunkenness, when the loss of sensation is made very manifest. Perhaps the earliest reference made to a state of insensibility and its effects is found in the Bible, Genesis, chapt. 9, 21, where we find that Noah, during a period of hilarity drank an excess of grape wine and became drunk. While in this state of complete anaesthesia he was taken to his tent and there, by his kin, was disrobed and allowed to remain nude until he would wake, and thus suffer shame by his nakedness. According to the Holy Book, this instance of artificial sleep occurred 2347 years B. C. Thus we see that at a very early period of man's existence traces of the unknown "sleep producers" were noticed. Chronology tells us that the paralyzation of nerves by narcotic drinks and drugs was known to the ancient Etrurians as early as 1500 B. C.

The Greeks, who were at one time a very intelligent, dexterous and progressive race, were well skilled in the arts and sciences, and to them undoubtedly belongs much deserving credit for the discoveries in the science of medicine and art of surgery. Homer, the Greek sage and historian, tells us that Aesculapius, a surgeon, who died about 1250 B. C., used a narcotic to produce insensibility to pain, or anæsthesia; and he also tells us that this great man was the first to teach the art of tooth drawing and purging. Aesculapius performed many wonderful operations, and his skill enabled him to cure the most desperate diseases. He was thought of so highly by Greeks that a statue of him was made in gold, and he, after death, was called the god of medicine. The narcotic this eminent surgeon used was prepared from an herb called nepenth, which grows in marshes and swamps in India and China. From this plant, he drained a drug or potion which he named nepenthe, meaning "to produce sleep and forget sorrow, grief or pain." This his patients would be required to drink, after which complete anæsthesia would follow and painless operations then he 'd perform.

From the fertile soil of Greece, we now meander to the sunny lands of Egypt, Turkey and Arabia, and here we learn from legendary history that a secret preparation was used by surgeons to cause non-sensation, and that only the elite or superiors were allowed the pleasure of sleep while operations were being performed. The drug used by these oriental surgeons was prepared from the dried leaves of hemp, and this narcotic drug was known by the name of Haschish. Neighborly to these countries, we see Morocco, and in the archives of the times we observe recorded that the dried flowers of hemp called "kief" contained so much of the narcotic principle that a small pipe filled with them, if smoked, produced sufficient narcose to perform minor surgical operations without pain. The precise date of the discovery of anæsthesia by these people is not known, but it must have been centuries before the Christian era.

The Chinese at this time were a very persevering class of people and they made wonderful advancement in the arts, and especially in the sciences. In medicine and surgery they were considered without a rival, and the kings of China instituted a free school for those citizens who were inclined to study and practice surgery. Although it is very difficult to ascertain facts, figures, or any knowledge of Ancient China, it, notwithstanding, fortunately happens that John Chinaman forwards us, and with much pride, the history and progress of the medical science in his land. A Chinese manuscript is deposited with the French Academy of Science, which gives much information as to the Chinese method of hypnotising. In this paper it tells us that perfect narcosis was produced in people suffering from severe accidents, and later the king's surgeon discovered the intoxicating effects of opening the inspissated juice of the unripe capsules of the poppy plant. The physiological action of opium in small doses has a very quieting influence, inducing a peculiar, dreamy condition; but in large doses sleep comes on almost at once, and sleep comes following in less than two minutes.

We will now bid the superstitious Chinaman farewell and travel to the land of war—Italy—there to greet the model Romans. Although the Roman was constantly engaged in battle, yet much attention was paid to the finer arts, and in the spare opportunities the busy men studiously labored to not only be rulers of lands and wealth, but to be kings of learning and culture. The great Roman historian, Herodotus, who lived about 400 B. C., makes numerous references to the skill of Roman surgeons, and he tells us that the medical science of Rome dates from 500 B. C.; that the soporific principle of the mandrake was discovered, and a somnambulistic state produced, affording surgeons opportunities to perform painless operations. This anaesthetic agent they called "Mandragora," of which the immortal Shakspear makes reference in the play of Anthony and Cleopatra: "Give me to drink mandragora, that I might sleep out this great gap of time." The greatest Roman surgeon that ever lived, says Heroditus, was Hippocrates, who lived about 450 B. C. This genius was a distant relative to scÆulapius, and, like this great man, was divinely skilled in the practice of medicine and surgery. He it was who first undertook to collect the fragmentary knowledge of medicine and restore it to something of order. He classified and described diseases, and with him medicine and surgery began the career as sciences. In his works we find mention that he produced perfect narcosis by inhaling the vapor of Bangue. This would give him the credit of being the surgeon who first administered an anæsthetic by inhalation. After his death the science took a retrograde step and fell to the hands of the Roman priests, who made use of the new science to further the confidence of the populace in the belief that divine power was vested in the priesthood. Pliny says: "Thus the priests became the recognized surgeons, and they taught the science with many occult and mysterious ceremonies, well calculated to impress the vulgar and to excite belief in their miraculous powers." So we see that the science of Anæsthesia was confined to the priestcraft, and they took good care to keep it well saturated with mysteries to the unitiated, but they themselves were well posted and studied laboriously to gain knowledge in this promising new field. The priests discovered numerous medicinal agencies which had anæsthetic properties, but the outside world was held ignorant of priestly accomplishments. While the science was being cradled by these impostors, the common surgeon was prohibited from practice under penalty of imprisonment or death. Thus three hundred years rolled away, anæsthesia itself asleep, and nothing appears worthy of note.

Sumner has wisely said that "Vice and barbarism are the inseparable companions of ignorance," and that "Without knowledge there can be no sure progress." Hence,we comprehend why there was a pause in the research of Anaesthesia. The priests having full sway and unlimited power, kept all information from the laity, and only a select few who had influence and were in good pecuniary circumstances could learn of the new and wonderful discovery. But now, gentlemen, at this late date of the existence of the Adam family, knowledge of every kind has become general and permanent. It cannot be confined to a select circle, or crushed by tyranny, nor lost by neglect. The Press, watchful with its hundred eyes of Argus, strong with more than a hundred arms of Briareus, not only guards all conquests of civilization, but leads the way to further triumphs; and yet we find even at this late day some periodicals, and especially dental journals which are published by dental dealers, who have patents on gas appliances, and who also manufacture Nitrous Oxide Gas, refuse to allow articles published which teach the differences of physiological conditions and causes of these conditions—hence encourage the production of asphyxia instead of anæsthesia by an agent in which they are interested financially, and reject any and all manuscripts which would tend to cripple their present business interests.

The science of Anæsthesia from the 5th to the 18th century was entirely neglected and to the suffering masses lost in oblivion. However, in 1766 a German physician, Franz Anton Mesmer, popularized a system called Animal Magnetism, which became known by the name of Mesmerism. This man believed that the stars exercised a great influence over men, and identifying this with magnetism, sought to effect cures by stroking his patients with magnets, putting them to sleep and affording chance for painless operations. He soon, however, abandoned the use of magnets and stroked them with his bare hand. He was a very shrewd man, and by largely advertising the new force he discovered he awakened world-wide interest. In 1778 he moved from Germany and made his residence in Paris, where his parlors soon became the rendezvous of the suffering earth. The manner in which he would produce a state of Hypnotism is as follows: Mesmer would sit down opposite his subject, grasp the patient's hands, stare at his eyes. After a period of about ten or fifteen minutes, he would leave go his hold and make strokings with his hands at a distance of a few centimeters of the body of the subject, from the top of the head slowly downwards, letting the tips of his fingers remain a few moments on the eyes, chest, pit of the stomach and the knees. The effects on the patient were various; most of them could go to sleep, while some few jump up, weep, laugh, walk about in an idiotic manner, and a few others would sing. But during the entire period the patients were all blindly submissive to Dr. Mesmer, who could sway them as he liked. This system of Mesmer's is the initial letter to the science known as Hypnotism; and in a journal published in Paris, called "Hypnotics," a few suggestive inklings from Mesmer are quoted. In this paper he says: "Animal Magnetism or Hypnotism is the science of the sleep-like state which manifests itself by various phenomena, and is produced by a special influence on the nervous system, either by another person's presence and powers, or, though more rarely, by a spontaneous action. All persons are susceptible to this power, but some are more liable than others. A difference, however, must be made between those who are easy and those who are difficult to hypnotize. Among the former are patients who are willing subjects and who can concentrate their thoughts and attention on the intended sleep. Age is of consequence, since I find it easy to hypnotize a young person. Climate seems to make hypnotization easier in warm rather than in cold countries. The condition for hypnosis is favored by the following: By quiet and rest, both internal and external, by twilight and darkness, soft music and fragrant flowers; and the oftener a person is hypnotized the easier he will fall to sleep. Conditions unfavorable are: noise, full stomach, mental emotions, chill or fever, strong light, damp atmosphere, alcoholic liquors, and coffee, tea and tobacco. Idiots and insane persons can with much difficulty be effected, and if success is attained at all, it is done by staring in the eye of the subject." Thus from Mesmer's own pen we get a few points as to the great discovery. The receipts of Dr. Mesmer in one year were 100,000 livers. His system had become established, and the French Government offered him 20,000 livers and agreed to build an immense infirmary or hospital if he would disclose his secret, but this offer he unhesitatingly rejected. The French Government then appointed a commission, of which Benjamin Franklin, of America, was a member, to investigate this new science called Mesmerism. The commission reported that much truth was embodied in the works of Mesmer, and that unquestionably there existed powers in Animal Magnetism. The friends of the great genius, Mesmer, desirous of rewarding him with some lasting pecuniary advantage for his discovery, instituted a college, the pupils paying each 100 livers tuition, and the first year he cleared

340,000 livers. Among his pupils we find Lafayette, D'Eslon and many others of the polite world. In 1785 Mesmer left Paris and passed the remainder of his life in retirement in Switzerland, the possessor of considerable wealth and a lasting name. The future for hypnotism is beyond doubt very promising, and much good will result from knowledge concerning the wonderful science.

Just about one hundred and twenty-five years ago a chemist, Priestly by name, discovered a gas which he called nitrous oxide, but the discovery was thought but little of since it answered to no purpose. A new era dawned a year later when Sir Humphrey Davy scientifically investigated and demonstrated the asphyxiating properties of nitrous oxide. But even his disclosures attracted but little attention until in 1844 when Dr. Horace Wells, a practical dentist of Boston, by mere accident discovered that the gas could be made to serve a practical purpose. And much unlike many in our profession who prefer trying new experiments on other people, we are informed that Dr. Wells himself inhaled the gas and had a large molar painlessly extracted. His efforts and discoveries soon brought him and the gas before the surgical world, and his labors were so highly cherished that a very costly statue of him was erected in a public park at Hartford, Connecticut. Let us now concisely view the merits of the gas.

Nitrous oxide, $N_2. O.$, is a colorless, almost inoderous gas of a sweetish taste. It is prepared by heating solid nitrate of ammonia in a flask and collecting the gas evolved over water. In reaction it is neither alkaline nor acid. It was formerly considered a safe anæsthetic, and is used in dental practice mostly, as its effects are too short in duration to answer in long operations. Nitrous oxide, when first inhaled, causes exhilaration, dizziness with ringing noise in the ears, tingling sensation extending to the extremities, loss of power in the voluntary muscles due to asphyxia, and finally producing insensibility. According to the temperament the state of excitement is transient or prolonged; in some cases there are strange illusions with a form of intoxication which manifests itself in the patients — singing, laughing, crying, screaming, and sometimes a disposition to assault all within their reach. To a bystander the patient assumes a very alarming and death like appearance, the face at first becomes very pale, the jaws become fixed, the eyes protruding, the respiratory organs highly excited and the breathing stertorous; and the visitor becomes startled on seeing a bluish purplish color stealing over the lips, cheeks and temples. So far as the external phenomena can afford any indication, we are forced to pronounce the patient in an asphyxiated condition. Now this state of affairs, is of serious importance to the modern dentist, since he holds the life or health of the patient in his hands. Asphyxia is a state in which the blood is deoxidized, and the forces and functions of life are suspended. If this be true, the patient in this condition can unhesitatingly be said to be on the threshold of death.

Now let us see why this condition or asphyxia is so dangerous, and also, let us investigate why nitrous oxide produces these very undesirable results. In case of asphyxia the person becomes of a purplish blue color, and this we learn on examination is due to a lack of oxygen in the blood. The venous or unoxygenated blood being in superabundance makes itself manifest in the capillaries and even in the arteries. The respiratory muscles are under this condition so weakened that respiration ceases, and the blood remaining unoxygenated for a short period the finale is—death. Hence we see that oxygen plays a very important part in the human economy, and in fact is the force of life, consequently oxygen becomes the all important element to be sought in administering any anæsthetic. Consequently, as you cut off or suspend free oxygen from the blood the pulmonary glands of the lungs cease to generate and furnish the patient with the food of life, namely arterialized or oxygenated blood. The question then would arise why does nitrous oxide rob the blood of free ogygen, since it is composed of two parts of nitrogen and one part oxygen? The answer to the query is as simple as it is true. Nitrous oxide, N_2. O., has oxygen and nitrogen chemically combined, and in accordance with a fundamental law of chemistry it has none of the essential properties or powers of either of its component parts. Thus, when this gas is inhaled into the lungs it is absorbed and carried to all parts of the body by the blood. The gas being a chemical compound the affinity of the blood for the oxygen can not overcome the affinity of the oxygen for nitrogen, and hence nitrous oxide enters the blood and is eliminated from the blood unchanged in its chemical combination, thus causing asphyxia.

Dr. Loenard gives three stages characteristic of asphyxia produced from the administration of nitrous oxide gas, and deeming them of vast importance, I here give them. 1st. A stage of increased respiratory movements both of the inspirations and expiration: 2nd. A stage of convulsions; 3rd. A stage of exhaustion, in which lingering and long drawn inspirations gradually die out, these gasps spread into convulsions; stretching of the body, and extended limbs and straightened trunks, the head thrown back, the mouth wide open, the face drawn and the nostrils distended as the last breath is taken. As to restorative agents, the application of nitrite of amyl to the air passages and then sudden intermittent pressure on the chest to bring about an expiration of the lungs and contraction of the heart; steadily raise the arms to produce inspiration: this done a few times, gradually apply ammonia to the nostrils.

The foregoing clearly shows it to be an asphyxiating agent. Besides, deliberate investigation of the matter by M. M. Joliett and Blanche, of France, establish the statement far stronger. These eminent researchers tell us decidedly that Nitrous Oxide gas is not capable of yielding its oxygen to the blood to support life. And to illustrate this they tell us that in this gas a mouse will live but from 30 to 60 seconds; a pigeon but 2 minutes; dying from a lack of oxygen causing death by asphyxia. And what we, in case of gas, term complete anæsthesia when the person becomes blue in the face, is in reality but aperfect state of asphyxia.

The next anæsthetic agent after Nitrous Oxide to appear before the medical and dental world was Sulphuric Ether, which was discovered by Dr. Pearsons, of Birmingham, England, in 1775, but at this date he used it as a cure for asthma and other lung affections. However, in 1818 Faraday showed that the inhalation of Sulphuric Ether produced anæsthesia. In September, 1846, Dr. Morton, a dentist of Boston, employed the vapors of Sulphuric Ether for the painless extraction of teeth, and this successful achievement at once marked a new epoch in the art of surgery. Ether, from the latin, means "to burn, to light up, to shine." Its formula is—$C_4H_{10}O$; it is a colorless, limpid, volatile and inflamable fluid with a sweet odor and a hot, pungent taste, and on account of its great volatility it should be kept secure in ground glass-stoppered bottles. Its vapor is two and one-half times heavier than air, and supports combustion. It is soluble in alcohol, and is itself a powerful solvent. Its boiling point is 95° Fah. It usually reddens litmus paper slightly, and when strongly so it is impure. This liquid is obtained by the distilation of alcohol with sulphuric acid, and there are numerous compounds of this fluid.. Its anæsthetic and physiological action being very similar to chloroform, we will consider the actions under chloroform.

About fifty years after the discovery of Sulphuric Ether Samuel Guthrie, of Sackett Harbor, New York, prepared a colorless, oily liquid which he called chloroform, and for many years the fluid remained a mere chemical curiosity. But in November, 1847, Dr. Simpson announced the anæsthetic properties of chloroform and proposed that it be substituted in place of Sulpuric Ether. So convincingly did he demonstrate the great advantages of chloroform that it speedily superceeded the use of ether as an anæsthetic. Chloroform, formula, $C. H. Cl_3$, is obtained by the distilation of alcohol with chlorinated lime. It is a colorless, volatile liquid, of an agreeable, ethereal odor and a hot, aromatic, sweet taste. It is slightly soluble in water, and readily dissolves in alcohol and ether. The boiling point is 142° Fah. The physiological action of chloroform and those of ether are very analogous except that the choking sensation in chloroform is absent, and the stage of excitement is generally, but not always, much shorter and less violent than in etherization. The first effects when inhaling either of these narcotics, is a burning of the fauces and a feeling of strangulation. The first indication of the systematic action is a sense of exhilaration and a lightness in the head, associated with a roaring and buzzing in the ears. These are soon succeeded by a feeling of the immediate surroundings being far off, and then in turn anon follows unconsciousness, with visions and illusion, and even often a delirium accompanies these latter stages. The second stage of narcosis is manifested by a complete loss of consciousness and muscular relaxation, followed with slow, regular breathing. The pulse under chloroform becomes very rapid, and the respiratory muscles generally become paralyzed. The pupil, at first contracted, becomes dilated, and then we have complete anæsthesia. Under ether the pulse becomes slower and there is much mucus discharged from the bronchial tubes of the lungs, and disturbance of pneumo-gastric nerve, resulting in vomiting. Chloroform possesses the advantages of quickness and pleasantness of operation, smallness of dose, and cheapness.

Chloform and ether can be easily administered by folding a piece of lint of three or four thicknesses, of a funnel shape and of a size that can be held conveniently in the hollow of the fingers and palm of the hand. Pour the narcotic in the funnel, at the apex of which have a small sponge, and then place the cone, base end over the nose and mouth of the patient and request them to breath regularly and deep. The administrator then should watch the breathing and as well the pulse. If the patient cough remove the cone and allow less anæsthetic; then gradually resume administering. In case of chloroform the pulse should have the undivided attention of the administrator; in ether, the respiration should engage his attention.

The conditions rendering general anæsthesia dangerous are: previous alcoholic habits, brain tumors or degeneration, enlarged tonsils, thoracic tumors or anenrism, heart disease, lung troubles and hysterical idiosyncrasies. The dangers which accompany anæsthesia are: syncope, dropping of the tongue, suspension of the lungs, and heart's action, or shock caused by painful operation when incomplete narcosis had been attained.

As restoratives, lay patient in horizontal position and apply ammonia to the nostrils in case of syncope; dropping of tongue, tip the patient forward and grasp the tongue with instrument and pull it forward; in case of suspension of respiration, immediately resort to Sylvester's method; and loss of heart's action, apply nitrate of amyle to the nostrils.

Of late the science of anæsthesia has been but little probed, and, unfortunately, many deaths have occurred which by a better knowledge of anæsthetics could have been avoided. Perhaps the most important discovery and invention of the last decade, in the field of anæsthesia, was brought to light by Dr. Hayes, a practical dentist of Pittsburgh, Penna. He, it appears, has invented an apparatus and discovered a narcotic preparation which assures perfect safety in producing narcosis.

The apparatus, though seemingly intricate, is comparatively simple to those who make anæsthesia a study. How anæsthesia is accomplished and rendered absolutely safe by his method can be explained and with much satisfaction.

This anæsthetic known as the "Aerated Hypnotic" has many superior qualities, and the apparatus with which it is administered allows it many excellent advantages. To briefly consider its merits as compared with anæsthetics such as chloroform and ether, omitting nitrous oxide, as this is an asphyxiating not an anæsthetic agent, and I find it presents at least five superiorities:

Firstly, a pure anæsthetic must have an oxygenating tendency on the blood, since oxygen is the only known element which will safely carry on the forces and functions of life, and without this all important constituent in the blood death is knowingly invited. The oxygenation of the blood by the Hayes process is well assured since the patient is allowed to breathe the free or uncombined oxygen of the air. Secondly, death may result in cases when the blood is in a perfect state of oxygenation, but an overdose of the narcotic fluid to the .nervous system, suddenly introduced, may cause the fatality. Thus must we not only watch the circulatory but also the nervous system. And this serious result the Hayes apparatus safely prevents, since on the instrument appears a dial which clearly indicates the percentage of the administrating hypnotic. Thirdly, we learn from sad experience that the atmosphere surrounding the patient has much to do with the safety of the anæsthetics; we know that the air is capable of carrying different proportions of the vapors of narcotics at different temperatures: Thus, at 40° F the air absorbs about six per cent., while at 60° F its capacity is twelve per cent. The average patient can be completely anæsthetized with but three per cent. of chloroform, and six per cent. is seriously dangerous, while twelve per cent. would result in death. Hence we see that in warm or high temperatures there are more deaths by chloroform and ether than in cooler periods of the year. This risk we find easily avoidable by the new process, since the apparatus contains a thermometer which allows the administrator to know the temperature of anæsthetic at all times. Fourthly, most deaths attributed to chloroform and ether have been said to be the result of heavy globules of vapor, or an excessive proportion of the narcotic over and above the powers of endurance of the patient. In the Hayes apparatus these dreadful results are obviated, since by an air forcing device the globules of the vapor are destroyed by swift counter currents of air, and producing a light, attenuated vapor having requisite properties to support life. Fifthly, the irritating effects in the fauces and bronchi and the vomiting caused by chloroform and ether have oft proved fatal, since the patient in a semi-somnambulistic state chokes to death by the refuse of the vomited mass. More desirable effects can be attained from the Hayes process, since it is non-irritating to the lungs and enticingly pleasant to inhale.

However, gentlemen, we have not yet in our possession the ideal anæsthetic; notwithstanding in the Hayes process and apparatus, etc., we have a near encroachment. The future must bring for us an anæsthetic free from the intricacies accompanying its administration.

THE CODE OF ETHICS IN ITS RELATION TO THE PRESENT NEEDS OF THE DENTAL PROFESSION.*

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The code of ethics, in its relation to the present needs of the dental profession, is a set of arbitrary rules, enacted by men whom we all respect, but who adopted them in the spirit of imitation. Being anxious to be considered medical men, they aped that profession in the formation of societies and in the adoption of written rules of conduct.

The dental code is a modified copy of the medical code; and the medical code is almost substantially a copy of a code of ethics prepared at the end of the last century by a Dr. Percival, of Manchester, England, and intended to serve as a guide for his son, who was about to begin the practice of medicine in a distant city, away from parental jurisdiction. That we, the practitioners of a century later, should feel that we are still in the position of the worthy Dr. Percival's son, is belittling to our professed dignity, and an unworthy admission that, having no father to guide our faltering steps, we needs must lean upon written rules lest we totter into the mire of ungentlemanliness.

Leaving dogmatism for awhile, let us consider whether or not there is a good purpose in the continuance of the code, and, if so whether these written rules are observed, and whether the wished-for result is attained.

To descend to personalities for a brief moment, I will state that after practicing for fifteen years I dare to assert that I have never in any way broken a rule of the code, either in the letter or the spirit. Yet I never read the code of ethics until about a year ago, when I was named as one of a committee to revise the constitution and by-laws of one of our local societies. If these two statements be—and they are—true, then it follows that the code of ethics, as a written code, has had nothing whatever to do with controlling or forming my professional conduct. And I contend that this will always be the case. A professional man is a professional man, not because of forced obedience to special law, but by inherited instinct. Per contra, no amount of written law,will convert a blackguard into a gentleman, nor make a charlatan a professional man. What it will do, however, and what it is doing all over this country, is, that by specifying a mode of punishment for slight wrongs, it enables the charlatan who cries so loudly that he is professional to grind down the poorer man who is his neighbor, and who is attempting to rise. It enables this ass who hides his true form in the skin of a lion to terrorize his brother-dentists, so that while they scrupulously follow the code, he is surreptitiously lining his own pockets. He builds up his practice by methods just without the pale of the code and its punishment, and to which his neighbor would not descend, code or no code. To be more explicit, I must enter the dread domain of advertising. That is the great bugaboo of the code men. Yet the code is so elastically drawn that it will exclude what might be considered legitimate and honorable advertisement, while it permits, or at least cannot punish, advertising which is far more profitable to the man, though unworthy the gentleman.

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In my position as chairman of the executive committee of this society, my attention has been drawn by many men both in and out of the society, and in and out of the State, to certain so-called infringements of the code, with the expressed wish that I should give an official opinion upon them. For example, I have been asked whether or not it is not advertising for a man to write an essay, and then to circulate the reprints of the same. I have looked into this rather exhaustively, and I find that it is commonly done among physicians, whose code we are copying. It is done, too, with the distinct intent of advertising the ability of the author. True, the circulation is generally limited to medical men. But it must not be forgotten in this connection that the spirit of advertising is to increase patronage. In the medical world, we find that the field is so large that it is cut up into many separate departments called specialties. In each, the specialist restricts himself to his one line of practice. Thus, the gynecologist feels perfectly safe when he sends a patient to an oculist, because he knows, first, that the oculist will do nothing to prevent the return of the patient to himself for gynecological service; and secondly, he knows that the favor will be reciprocated and that the oculist will some day send him a patient. Thus the distribution of reprints among physicians is not only advertising, but is advertising in the most promising field. If the same reprint reaches the patient direct, it will not have as much effect as when it goes to another practitioner, who becoming convinced by it, then advises his patient to seek the author for assistance in line with his specialty. But it is also permissible in certain directions for the physician to send his pamphlets direct to his patients. For example, I have seen innumerable dietetic lists headed with the name and address of the physician recommending them. This is a common and growing practice. A card of this kind is kept by the patient, and is not only passed to others, thus helping the physician by spreading his fame, but it is beneficial to society in circulating wholesome advice. Thus it would seem that the dentist could cite ample authority for the mailing of reprints either to his colleagues or to patients.

From the dentist's standpoint there is little advertisement in sending reprints to fellow-dentists, for it is a well-known fact that dentists do not send their patients to other dentists, at least not to men in their own city, except for free consultation. This brings us to a consideration of the distribution of the pamphlets among his own patients. I believe that under our present code a strict jury would decide that it is a breach to do this. Yet if so, then the code is plainly militating against one set of men to the advantage of another. If Dr. A can do a thing thoroughly well, and Dr. B can do it not only as well but also has the ability to write a lucid, comprehensive description of his work, he is a more useful man than Dr. A. Then if Dr. B does write a description of his work, and publishes it, does he not place his professional brethren under obligation to him, since he suggests to them, and enables them to do, a new and useful operation? Should those beneficiaries be able to appropriate his brains and labor to their own uses, and then, hidding behind the code of ethics, have the right to prevent Dr. B from reaping the reward from the public which he will never obtain from the dentist, except from those who like himself, are constantly giving to the multitude, and reciving nothing in return? I hold that a man has the distinct right to manage and control his practice to his own best advantage. It must be remembered, in the first place, that to advertise among strangers, is true advertising. To send reprints to one's own patients is totally different. These patients constitute the field of a man's practice, that he has already gained. If he has the brains to write a pamphlet, why should he not have the privilege of sending it to those who are already attached to him? Why should he not have the right to make these persons better aware of his ability, thus increasing their confidence in him, and at the same time rendering it more difficult for his unscrupulous neighbors to wean them away from him? For these neighbors, who so love the code, will not hesitate to advertise themselves with their tongues, since they cannot do it with their pens. The truth is, the reprint scheme is less condemned among physicians, because physicians as a class have more literary ability. More of them are able to be authors and partake of this method of advertising.

In setting up this line of argument recently, the question was asked, "Why could not these reprints, sent to patients, get into the hands of other men's patients?" My reply is, that where that happens, so much the better for the clever writer, and so much the worse for the other man. If he cannot keep his practice more attached to himself than this, he deserves to lose it, and the probability is that the patient will be benefited by the exchange. Besides, is not this exactly in line with legitimate methods of attracting patients? A woman, living in a boarding-house, let us suppose, goes to a dentist, and has considerable work done. A number of conspicuous and beautiful gold fillings are inserted. She shows her teeth to other women in the house. They at once draw comparisons between their own work and that which is shown to them. If the difference is to their own disadvantage, they change their dentist. The man has advertised himself through his work, and through the confidence which he has inspired in his patient. Where, then, is the difference with the reprint? If the reprint convinces his patient that he is a skilled man, why should she not have the right to boast for him to her friends, and why should he not have the emoluments accruing therefrom? The field is not an exclusive one, except so far as the ability to enter is. It is not like paying for a newspaper advertisement, for that is open to anyone who has a pocket-book, The other is advertising, if you please, but it is advertising that is but the just desert of the man who has spent his nights in study, and thus after long waiting gains prestige and patients, while his neighbor has been increasing his own practice by systematically working his church, his club, the tradespeople with whom he will only trade on a plan of reciprocity, and his friends whose confidence he gains over numerous bottles of wine.

The code of ethics, then, strictly construed, would term the distribution of reprints as objectionable advertising, and therefore contrary to professional spirit. Thus the student is tyrannized over, and remains a true professional man, but a poor one. Why? Because he devotes his nights to study.

How does the code control the other man, who sells his textbooks after procuring his degree? I will give you a sketch of such a person. As soon as he gets his office started, he goes to live in a large boarding-house. He works the whole house into his ledger account, and then he moves to another boarding-house. Has he broken any specific rule of the code? Not yet,—or at least you could not convict him of it. Soon he joins the church, and perhaps the choir; he becomes an active member of the Young People's Society. He fills the preacher's teeth and sends him a receipted bill, and in exchange the preacher tells everybody in the church. Is there anything in the code against joining a church and doing gratis work for the clergy? I think not. He starts several entertainments for the benefit of the church debt. It is mainly through his energy that they are successful. He also heads as many subscriptions as possible. In fact, he makes himself popular in that church. Meanwhile he joins a man's club. Here he spends his off nights. He becomes an adept at billiards, and he plays a good game of ninepins. He wins a few tournaments, and stands treat for the crowd. He gets upon the executive committee, and his great executive ability shows him the way to get most of the club men into his office.

Then he joins the Masons. He associates himself with different lodges and orders. Then perhaps he prints his card, or a few of them, for special circulation, something like the one which I will pass around. Observe that there is a conspicuous Masonic symbol in one corner, while we are told to what lodge he belongs. This of course is a bid for patronage through Masonic fraternity. I have erased the name of the dentist from this card. I did that because, however I may object to the code, I wish to be a professional man myself. To return to our ethical dentist. One day one of the elders of his church comes in and shows him a reprint bearing the name of a man whom he knows to be a skillful and reputable dentist. The pamphlet, too, is one of merit; the writer describes therein a useful operation original with himself, and beyond the ability of our friend, who has done no studying since he left college. What does he do? His commercial instinct comes to the front, of course. He at once denounces the writer of the pamphlet as a charlatan. He says to his patient, "Why, my dear sir, the thing shows on its face that the man is a quack. Don't you see it is an advertising dodge? Don't you know that no reputable professional man would stoop to this sort of thing?" He has the confidence of his hearer, and of course wins him over. But has he behaved in a truly professional spirit? Yet where does the code come in, in this? It does to this effect. A charge is made against the offending author, and he is publicly punished by his society, or else his accuser, fearing to make so open a stand, goes about among others of his kind; they band together, and systematically do all they can to injure the man whose work has benefited them all, but who has dared to try to advertise his own ability, which he has earned by such hard labor.

In dismissing this phase of the subject, I wish to be personal once more. I have written much, as you all know. I have had but three of my articles in the form of reprints. One of these would not have been intelligible to any but the dental world, and was sent exclusively to dentists. The second was distributed in a similar manner, and the third is still in my office, though I intend to send it to physicians. I had these reprints made with the specific purpose of advertising myself among physicians in connection with a specialty, and do not hesitate to make the statement. I have never as yet mailed reprints either to patients or others, but I should certainly do so, if I thought that it would be any advantage to me. If this be a breach of the code, perhaps I am fortunate, since I cannot be punished until I commit the act.

Of course, I am well aware that it will be said by some that the two pictures which I have drawn are exaggerations, more especially the latter; yet I am positive that there are hundreds of men who pursue precisely those methods of practice, and who yet obtain conspicuous positions in the community and in the dental world. Of course, the community, being commercial in its instincts, sees no wrong in it, while the transactions are so cleverly managed that the dental world never can put finger upon the misdemeanors.

I know a man who personally told me that this reprint business is in his opinion contrary to the code of ethics, and reprehensible; yet he does not hesitate to write personal letters on society paper, on which his own name is printed as one of the officers. Thus we kill the cat to make our fiddles sing.

To come, then, to my idea of a code, it is this: The present code is utterly useless. First, because it does not describe specifically all that which should be against the spirit of the rules; secondly, we have various forms of the code adopted by different societies; and third, it is practically a dead letter in that it permits sins in one direction, which are as bad, or worse, than those designated for punishment.

Claiming for myself that I am thoroughly a professional man, I have not the slightest objection to a code of ethics, if one can be devised that will be operative, and so coercive that the little fish shall not be fried for the pleasure of the big. I would suggest that a committee be appointed by the American Dental Association to co-operate with one from the Southern, and that these two shall decide whether or not a code benefits the profession. If so, then let them formulate one which will fit the present status of dentistry better than this relic of bygone days.

In the first place, let them designate in no uncertain terms what is, and what is not, obnoxious advertising. Let them say that a man shall not advertise in the public prints, paying for the same. That he shall not invite a friendly reporter to describe his office and himself in glowing terms. That he shall not, because he has a corner house, make that an excuse to have a sign on both streets. That he shall not object to his neighbor's handbills, while he himself has a handsome door-plate so large that a person can read it half a block away. This sort of thing is inconsistent. Let them, in fact, say exactly how large the sign may be, and what may be placed upon it. Let them tell what we may or may not put upon our cards. Let them say whether or not we may move twice a year and send a notice to every patient, under the flimsy excuse of removal. Whether or not we may have two offices, and alternate between them, using the removal notice as a device for keeping our practice together. Let them tell us if we may put half a dozen degrees after our names every time we sign them.

Let them say whether or not we may give free lectures on dental topics in public schools or in churches. Let us know if we may be interviewed by reporters, and if so under what circumstances. Let us know if we may write upon dental subjects for the education of the masses, and whether we may sign such articles or not. Let us have a distinct solution of the reprint question. Let us know whether or not we may show one patient the models of work done for another, and if we may admit in public or in private that we are dentists. In short, let us know if we are to have any liberty at all, and if so, exactly how much. Let us know the length of the chain which binds us, so that we may all be bound alike. Thus let us escape the thralldom which now shackles one man hand and foot, while the next, through chicanery, may have the freedom of the city.

Then let the committee get down to a consideration of fraternal courtesy. Let us know how much we may criticise the work of other dentists; how much we may say against their personal and private character; whether or not we can do this sort of reviling among dentists, so long as we do not repeat these scandals to patients. Let us know just how much courtesy,we owe to each other; also, how little we may display and pay the debt. Whether it is proper to allow our names to go down on society programs and then not appear. Whether, we can borrow money on the plea of brotherhood, and return it, or not as is best suited to our convenience. Especially let us know whether it is good ethics to print a calumny against another dentist, and then mail it to all his local associates. Let us know how far we may go in personalities in our journalistic writings.

But I need not continue in this line. If the committee of revision is ever appointed, and it cannot find flaws in the present code, then let it communicate with me, and I will agree to show one hundred loopholes, small in size to be sure, but large enough for the escape of the black sheep while the white remain to be shorn.

These specifications of the requisites of a code, of course, are exaggerated exactions. I know it. But if we must admit that we need rules for the guidance of our conduct, then in our pusillanimity, let us confess honestly that we do not know how to act with courtesy, integrity, professional justice, and fraternal feeling, and that in this predicament, we need some wise father to write out for us, in the most minute detail, how we are to guide our lives.

We claim that our societies are scientific bodies in search of knowledge, and then we throw up a barrier not of attainment, but of conduct, as though a blackguard may not be a great scientist, or as though every gentleman were a necessarilly wise man. Of course I would not argue for the admission of the rascally, or the ungentlemanly, but I only wish to point out that we have erected an erroneous standard of membership. It is one that is not in use among scientists in other branches of knowledge. Then why on earth do we need it? Are we so much less civilized?

To show that I am not alone in my derision of the code of ethics; I will quote from a few eminent men of the medical world who have written upon this subject.

Dr. Alfred C. Post, president of the faculty of medicine, New York University, speaking upon the operations of the medical code, says,—

"If such are the principles upon which medical men are to be governed, we can no longer be considered as members of a liberal profession, but as constituting a narrow-minded and intolerant sect, regardless ot the interests of humanity, and of the opinions of intelligent and cultivated men in our professions."

Dr. William S. Ely, physician to the Rochester City Hospital, writes:

"If asked whether I would do away with the code, I would answer yes. We must trust to the unwritten code of gentlemen, or to voluntary organizations, to uphold the moral tone of the profession. I believe these measures to be better than a set of arbitrary rules, which suggest that the body of the profession cannot be trusted without them. . . . Though we have had the code for sixty years, there has been no uniform conduct established thereby."

The same gentleman in another place says, "When I ask my professional brethern to show me a man whom they would not trust without a code, they point to one whom they are forced to admit they would not trust with a code."

Dr. S. Oakley Vanderpoel, M. D., LL.D., emeritus professor in Albany Medical College, writes,—

"The necessity for a code of ethics implies, first, that the social status of the profession, is such that an effort must be made to formulate in language what constitutes a 'gentleman.' This is an effort that no other liberally-educated or scientific body has made. Such a status, if not acquired by antecedents or education, can no more be formulated in language and applied to the novice, than can wealth and all its accessories applied to the ignoramus supply that which must be inherent or be imbibed in the first teachings of parental tenderness. Secondly, the necessity for a code implies that independence of thought and action cannot be tolerated; that no individual member of the profession, no matter what may be the peculiar circumstances under which he may be placed, shall exercise the right to act as his judgment dictates; but he must sink his individuality and submit to the impersonal dictates of a trades union which absorbs both the personality and the conscience.''

He then states that of course the object of the code, is to raise the standards and improve the condition and position of the profession. He asks whether the code has accomplished this. He admits that the profession has made tremendous strides, and then points out that every avenue to knowledge is being crowded with such earnest seekers after scientific truths that medicine has by no means passed other sciences, if indeed it has kept pace. He then says, ''If this condition of progress is taking place not only in countries where codes of medical ethics are unknown, but even here where its workings have been undisputed for years, why shall the profession belittle itself by formulas of deportment, when there is a broader unwritten, instructive, self-convicting expression, 'conduct unbecoming a gentleman'? To this comprehensive expression all formulas of the code may be brought. This is the only code which any other of the liberal professions demands.'' In conclusion of his most excellent thesis, he uses the following forcible language: ''There can be but one remedy in future action upon the subject of medical ethics; it is as futile to stifle discussion as it is to stop the force of a swelling current The formulated codes will be abolished. This is as certain as that freedom of thought and action are the palladium of our institutions.''

Dr. Lewis S. Pilcher, a prominent physician of Brooklyn, gets to the bottom of the matter quickly. He says,—

''A parent may formulate a set of rules to which he may require the child to conform his outward conduct as long as the child is dependent upon him for support. An employer may establish similar rules, conformity to which he may require as a condition of remaining in his employ. In both cases such conformity is a mark of dependence, a badge of servitude, and endured only under stress of necessity. A freeman rejoices in the right to regulate his own conduct, his manners, and morals, subject only to those limitations which the equal rights of other creatures impose upon him. . . Of all classes of men, physicians are certainly the least in the condition of children that need paternal watchguard and rules of conduct; yet the singular spectacle is witnessed of a large proportion of physicians insisting upon the necessity of such provisions, either for their own guidance or as a standard by which they may try the conduct of others. To one who has a high notion of the dignity of manhood as well as the deference due to his professional position, such a spectacle is a pitiable one, that might well excite his antipathy to the agents who made it possible."

Speaking of the working of the code, he says,—

"It tends to making every man a spy upon his neighbor, and has made persecutions of the most petty nature possible. It has placed in the hands of certain men a weapon to use against those that are weaker. It has created a multitude of star-chambers all over the land, in which men have assumed to sit in judgment upon and to exercise discipline over their peers as to motives and methods of professional conduct."

As this paper is already longer than I intended, I shall make no more quotations, though I have at hand most powerful arguments against the medical code, or anything of a similar nature, written by such well-known men as Dr. St. John Roosa, Dr. C. R. Agnew, Dr. A. Jacobi, Dr. H. R. Hopkins, and others of equal note. I have sufficiently shown that the medical world, whom we so affectionately copy, are by no means unanimous on this subject of ethics.

In conclusion, I have only to say that whether there be a continuance of the present formula which we term a code, whether there shall be a new one of more stringent doctrine to replace it, or whether the whole singular document shall be abandoned, I claim that a truly professional man maintains himself as such at all times, by conducting himself according to the standards of his own conscience. But as a last word I reiterate that if we are such barbarians that we must have written rules to obey, in a sense of justice let us produce a code which will operate more specifically and punish all alike.

J. C. REEVE, M. D., OF DAYTON, O., ON "ANÆSTHETICS IN DENTAL PRACTICE" (REVIEWED).

BY DR. S. J. HAYES, PITTSBURG, PA.

Reprint from The American Journal of *Dental Science* of December, 1883.

My attention has just been called to an article that appears in the October number of your journal in which some very unjust as well as unkind remarks in reference to the knowledge and qualifications of dentists in the administration of anæthetics, etc., are made, to which (through your kind indulgence) I desire to refer and if possible disabuse the author's mind of some of the errors he has espoused and is tenaciously advocating.

I might not feel disposed to take special notice of the article in question were it not that the author is quite prominent as a surgeon, stands at the head of a hospital staff in his city, is somewhat "looked up to" for the knowledge that he *assumes* to possess and seems to believe that what he does not know about anæsthetics and anæsthesia is not worth knowing. In fact, he assumes to be an educator of the dental profession and one of high authority in the article to which we now refer. It is flauntingly headed:

"ANÆSTHETICS IN DENTAL PRACTICE."
BY J. C. REEVE, M. D., DAYTON, OHIO.

Thus it will be seen that he feels the importance of his superior knowledge of the science of anæsthesia and anæsthetics as well as such a deep interest in the welfare of humanity, and especially of the dental profession, that he *magnanimously* volunteers to give the dental profession the benefit of his superior knowledge and extensive experience, as well as sound advice, to leave anæsthetics alone and turn the use of them over to the M. D's.

But as we find, even in the present age of progression, too many in both the dental and medical professions, and especially in the *latter*, who are quite thoroughly educated without being learned, or possessing very little learning or knowledge, it is important that we discriminate in the investigation of science between the mere opinions or the dogmas of those who assume to be our educators and the truths pertaining to the science. Some men possess a jealousy of others and of other professions of a kindred nature without being conscious of the fact. I will not say that this seems to be pre-eminently the case with Dr. Reeve, as I might be liable to the charge of doing him injustice, but will allow his own language in his premises to represent him : "As I am *decidedly opposed* to the administration of chloroform and ether by dentists, I will commence by disclaiming any disposition to consider the paper on the subject in any other spirit than that of science." The author is here referring to an article that appears in the September number of the *Dental Register*, from the pen of J. E. Harris, M. D., D. D. S., but as he dwells in his remarks very little upon the article, we shall only deem it our duty to treat of the thoughts that he advances in his article, under the influence of the genial rays of the science to which he is so devoted.

As the doctor refuses to "consider the subject in any other spirit than that of science," it may not be amiss to remind our learned friend that "science embraces those branches of knowledge which give a positive statement of truths as found in the nature of things," and that when we investigate science we are after truths and not mere *opinions* or *dogmas*.

Now, I propose to show that this self-constituted educator of the dental profession and gracious benefactor of the public, like many other M. D.'s who assume to know and to have superior knowledge, is *utterly ignorant* of the first principles, or A B C of the science to the defence of which he has devoted the article in question. In doing so, I shall not call in question his success as a surgeon, as that does not depend so much upon knowledge of any science as upon self-confidence and assurance, of which the author, it will be readily seen, has an abundance. But I will simply demonstrate that Dr. Reeve displays less knowledge of the science of anæsthesia and anæsthetics than would be expected of the most ignorant charlatan, though he may have used the agencies to which he refers extensively.

In the first place, the Doctor does not appear to have a clear conception or knowledge of what constitutes anæsthesia, and consequently is unable to distinguish between an anæsthetic and an asphyxiating agent, and hence (I submit) is utterly incompetent either to select or administer an anæsthetic. For if a certain, or definite condition be necessary for a safe and painless surgical operation, it is very important that the person who undertakes to put the patient in that condition should know *definitely* what that condition is, as well as to know in what respect it differs from other conditions to which it bears some resemblance, but which are known to be injurious and dangerous.

It is and must be admitted that this very desirable condition is the one in which the forces and functions of life are in continuance under modification. This modification may be induced by suitable narcotics, or by free oxygen or by both, whereby an absence of sensation is obtained. The force of life or that out of which vital force is generated, is free oxygen. This is found abundantly in the atmosphere, and is in fact the only element under heaven that will support combustion, or sustain either vegetable or animal life. Therefore, it is the all important element in your anæsthetic and without which you cannot have an anæsthetic nor can you produce anæsthesia. Any agency that does not contain free oxygen when administered can only produce asphyxia, and if continued, death. It does not matter what your agency is, if it does not have sufficient free oxygen to sustain life it cannot produce anæsthesia, but will inevitably produce asphyxia, and if continuously administered, death. And yet, Dr. Reeve calls nitrous oxide gas an anæsthetic and commends it to the use of the dental profession, when if he knows anything about its composition he should know that it has not a particle of free oxygen in it and that it can only produce asphyxia which always does such violence to the laws of nature, no matter whether it be produced under water, in the mines, or by giving exclusively nitrous oxide gas, olyphiant gas, carbonic acid gas, nitrogen gas, or chloroform or ether, or anything else that does not contain sufficient free oxygen to sustain life, that great injury to the nervous and physical constitution must inevitably be the result. Therefore, as the eminent Dr. Richardson said in one of his lectures, "The use of nitrous oxide gas should be prohibited by law." While insensibility is an attribute of asphyxia as well as of anæsthesia, yet they are radically different and diametrically opposite in their tendencies and results. The former may be properly designated as "the first step in at death's door," while the latter is the happy state of insensibility with the continuance of the forces and functions of life under modification. If chloroform, ether, nitrous oxide gas or anything else, that does not contain free oxygen be given without admitting the air by which free oxygen supplied, nothing but asphyxia and death can be the result. Hence, he who cannot recognize the radical difference between the conditions known properly as anæsthesia, syncope and paralysis, should not be permitted to administer an anæsthetic, no matter whether he be an M. D., or a D. D. S. For neither the M. D., nor the

D. D. S. appended to a man's name, makes him of itself any more competent to select or administer an anæsthetic, only as it may exist in the minds of those of very limited knowledge who have been educated to think that the M. D. has a magic that transforms and confers omniscience upon the otherwise ordinary personage.

But why is Dr. Reeve so "decidedly opposed to the administration of such anæsthetics as chloroform and ether by dentists?" Is it because they have less acquaintance with the so-called anæsthetics or know less of the science of anæsthesia than the physicians ? To which profession is the credit due for the discovery and introduction of the most of the pain obtunding agencies that are used to-day? Dr. W. Wells, a well known dentist, who discovered that insensibility to pain could be produced by the use of nitrous oxide gas, was the first to give to the notion its practical embodiment by the extraction of a tooth without pain. Dr. Morton, a former pupil of Dr. Wells, who discovered that aerated ether could produce anæsthesia, was the first to introduce its use as a pain obtunding agency in the painless extraction of teeth. For tooth-drawing chloric ether was first employed in this country by Dr. Jacob Bell, and Dr. Sansom, an English writer, says: (page 259, "Sansom on Chloroform,") "Since the introduction of chloroform that agent has been employed almost exclusively in this country as an anæsthetic in dental operations." But when these agencies were first introduced a terrible remonstrance was presented by many of the M. D.'s at the use of these dangerous elements, and then as now they were the accusers of the dental profession for the using of agencies of which they know nothing about, thus pretending that they know all about them, and that they are the proper custodians of humanity.

As Dr. J. E. Harris, in the paper on which Dr. Reeve bases some of his remarks, properly and correctly, intimates that the main reason why the general impression is extant that "it is more dangerous to administer anæsthetics for dental operations than for general surgery," and that more deaths have occured in the dental chair than on the gynæcological chair or table, "is the great difference in the sequel to a death under the hands of a general surgeon and a death under the hands of a dentist or oral surgeon." If a physician loses a patient from the use of the so-called anæsthetics, there is first usually a better opportunity to cover up or conceal the real cause of death, and no doubt thousands of deaths that have been caused by the improper preparation and administration of anæsthetics, and were in reality deaths from mal-practice, have never been reported. The cause of death having been assigned to the nature of the severe operation, or to the peculiar diseased condition of the patient. If the death occurs during the administration of the anæsthetic and previous to commencing the surgical operation, there is usually an effort to find a diseased condition of the heart, the lungs, or the brain, and of course that is not difficult to find, and the physician is relieved of a suit at court for mal-practice and the odium that might otherwise rest upon him in his community. He has several influential friends in his own profession and usually of his own school (physicians are not generally jealous of each other as dentists are of their brethren), who sympathize with him and are anxious to come to his rescue. He suggests to them that an autopsy be held with the consent of the friends of the deceased, and that they should conduct the same, and that they can either find clots of blood in the heart and assign that as an evidence of valvular disease of that organ, or find the lungs diseased or a congested condition of the brain, the arteries contracted and evidence of embolism and announce the one or the other of these as the cause of the death. Yet, who does not know that even a dead ox will have clots of blood in the heart, and that even alcohol much more so than ether or chloroform, will produce a congested condition of the brain, contract the arteries and cause evidence of embolism.

But if a death occurs in a dental chair during the administration of an anæsthetic and operation, it is difficult to create the impression that the nature of the operation was such that the patient might have died any hour, that the disease was of such a severe nature that the patient died from the effects of the surgery. Then again—and it is to be regretted—his brother dentists don't feel the necessity of coming to his rescue. In fact, many of them would rather see him suffer as that might slightly increase their practice and yearly income. And the physicians too often say he had no business to give the anæsthetic. He should have called in a physician. No autopsy is held, and the dentist, no matter how much better qualified he may be to administer an anæsthetic than the physician, is left alone to bear the burden of the unfortunate occurrence. No man, either in the dental or medical profession, who has been an observer of these incidents but that knows that I am relating the facts. The curse of this wide-spread impression not only lays at the door of the medical profession, but also, with the dental profession, and the time has come when this fatal error must be corrected and the odium wiped from the garments of the dental profession. In order to verify these statements I may be pardoned for an allusion to personal observations, experience and knowledge of both the medical and dental professions as to their qualifications respectively to the successful use of anæsthetics and the so-called anæsthetics. During the past two years, I have had the pleasure of talking to thousands in both professions at the medical and dental colleges and societies, upon the science of anæsthesia and anæsthetics, and have given over fifteen hundred clinics in the use of "Hayes' Process of, and Apparatus for Generating and Applying Anæsthetics," etc., which has afforded an opportunity of acquiring a knowledge of the attainments, experience and qualifications of men in both the professions as pertaining to the science, and use of anæsthetics. While I have found many in both professions who have extensively read and studied the science and have had a great deal of experience in the use of pain obtunding agencies; yet, I have ascertained that there is no other science pertaining to the healing art, that is so little understood as the science of anæsthesia, and (I regret to say) especially in the medical profession. Though there are only about 20,000 dentists in the United States to 100,000 physicians, yet, the dental profession have occasion to administer anæsthetics about ten times to the medical profession once, and as a consequence the dentists are pressed into the service and become more deeply interested. They are forced to read up and study the science of anæsthesia and the effects of the agencies employed, while very many of the physicians administer on an average scarcely once a month or once a year and some not at all. True, many of the surgeons in the hospitals and colleges and a few outside, have quite an extensive experience in the use of anæsthetics; but many of these even have given very little attention to cause and effect or the fundamental principles of the science. Others by the careful study of cause and effect, and skill in diagnosing conditions and causes of conditions, have become quite successful in the production of anæsthesia, but these are exceptions to the general run of the medical practitioners. On the other hand, it is quite different with men in the dental profession. You cannot find a dentist but that has occasion to use anæsthetics. There is a very great demand and he must supply the demand or lose a portion of his legitimate practice. Therefore, he eagerly casts about for the best, safest and most convenient agency to produce insensibility to pain. This accounts in part at least for the dentists having discovered and brought into use nearly all the pain obtunding agencies that are in use at the present time. Yet, in the face of these facts listen to the preposterous declaration of Dr. Reeve: "Certainly anæsthetics are administered for general surgical purposes hundreds of times for once in dental practice, and if so then the relative number of deaths under tooth-drawing is enormously large." Is there another physician in all this enlightened land that could be induced to make a similar declaration? To put the most charitable construction upon this wild dogmatic assertion, it must be presumed that the Doctor's acquaintance with the relative duties of both the professions, must be very limited indeed.

Again, in proof that "anæsthetics are more dangerous in dental practice than in surgery," he refers to the statistic reports of the relative causes of deaths as pertains to the nature of the operations from the use of chloroform in anæsthesia, as given by Dr. Sansom and by the Committee of the Royal Medico-Chirurgical Society. But even this the Doctor fails to report accurately. Instead of eight cases of death when teeth were either removed or to be removed out of 107 deaths of all surgical operations, he gives eight cases of death out of 100 as reported by Dr. Sansom, and instead of twelve cases of death from anæsthesia while teeth were extracted out of 109 deaths from all surgical operations, he gives twelve cases of death out of 107 as given by the Committee of R. M. S., Yet, these reports instead of substantiating the Doctor's extravagant statement only condemn the same. It will be borne in mind that the reports only give a certain number of administrations out of which so many deaths occurred. It is certainly a very low estimate to place the half of those administrations for the painless extraction of teeth which should give the half of the mortality in either report, but instead of half the mortality, we have about one tenth laid at the door of the dental profession and nine-tenths at the door of the medical profession. Therefore, from these or any other reports, it is not true that more deaths have occurred in the dental chair, than at the hands of the general surgeons. But it is true that when a death does occur in the dental chair, instead of a post-mortem examination and an effort to cover up the real cause of the death, as is the case usually when the death occurs at the hands of the general surgeon, the coroner is called in to investigate the cause and testimony of so-called experts, usually from the medical profession, is heard from the witness stand, who are there not in defense of the dentist as they from their standpoint usually have some misgivings and distrust toward the dentist as he might have called them in to do this work; but they are there summoned by the coroner to assist him in pointing out the real cause of the death and they seldom fail to put it where it belongs. Then the report is published in all the local and distant secular papers and the medical and dental journals pick it up from these with their constructions and comments. But how different when a death occurs in general surgery. The autopsy, the medical society, the medical and dental journals, all favor the unfortunate physician. Usually, it is quieted and does not reach the journals, frequently does not even get into the local medical society. Thus thousands of deaths, no doubt, caused from the miserable manner of preparing and administering anæsthetics, have never been reported and do not appear in the mortality reports from the use of anæsthetics. Now, I submit, whether this is justice alike to both professions and whether it is not high time that a new leaf be turned and that the dental profession shall demand the same protection from society and the respective professions as is accorded to the medical profession. The dentist of to-day is not a gunsmith, a blacksmith, or a barber, but has the honor of belonging to the most progressive profession of the age. His education and experience in special surgery and knowledge of the science of anæsthesia and experience in the use of anæsthetics entitle him to equal rank with the M. D., equal honor and protection from society and the laws of our country. In fact many physicians recognize the worth of the dentist's qualifications in the administration of anæsthetics and in critical cases prefer the assistance of their dentist in the use of anæsthetics to that of the medical practitioner, notwithstanding the earnest protests of our noted surgeon of Dayton. In still further proof of these facts, may I be permitted to state that during the past ten years in the line of my duties with "Hayes Process of, and Apparatus for Generating and

Applying Anæsthetics,'' I have administered chiefly for the extraction of teeth to nearly 9,000 persons, without causing a death, or producing paralysis of the functions of life, or asphyxia, and with but a very few cases of nausea. Moreover, from the many who are now using this Process, Apparatus, etc., (mostly dentists) it would be a low estimate to put the number of administrations by dentists at 60,000, without having a single death during the administration or operation (now, 1892, over 260,000,). I refer to the number of the administrations without causing a death not only to verify these statements, but to disprove another absurd statement, which, however, the Doctor is not alone in making, namely, that in consequence of ''the particular nerve involved in the dental operation, the acute pain caused by injuries to it and the powerful effect of sudden impressions upon its branches, upon the great and vital processes of respiration and circulation, by sudden impressions upon this nerve more than any other, is that inhibition of the heart's action brought about, which is sudden death.'' And that as ''anæsthesia for tooth-drawing is likely to be incomplete and will pretty certainly be so, if the operator is also the administrator,'' and that a ''state of partial anæsthesia is therefore one of special danger and especially so if the pain produced is at once sudden and sharp,'' and that ''such reflex actions are increased under chloroform.''

Now, I admit that the anæsthesia is not usually as profound, nor should it be, for the removal of teeth as for most other surgical operations, and for this reason: that if the patient loses the power to control the muscles pertaining to the oral cavity, and a tooth, or a root should happen to slip from the forceps, which will occur sometimes in the hands of the most skillful, it is liable to enter the œsophagus or larynx and cause trouble. But, if the patient be allowed to control these muscles, though he may be unconscious and insensible to pain, he will exclude the tooth. But, I deny most emphatically that the reflex actions are increased under partial chloroform narcosis. This is most certainly one of the most misleading fallacies taught. Does chloroform or any other narcotic make sensation more acute? Is it not a fundamental law of anæsthesia, that sensation diminishes as narcosis increases? And that the diminution of sensation, does not increase vasco-motor activity, but on the contrary has a tendency to retard? The inhibition of the heart's action can only be brought about by the suspension of the circulation of nervo-vital fluid, or animo-electricity in the inhibitory nerve, as that is the motive power of the heart's action. This suspension can only be produced by concussion and revultion, the result of which is the cessation of the functions of life. This concussion or sudden arrestation of nerve circulation, may be produced by a sudden action of the intellect, as by fright, or the sudden breaking of very sad news, or it maybe produced by an external agent, such as the sudden introduction of an over volume of electricity, or by sudden production of very severe pain, or a sudden introduction of an over percentage of a powerful narcotic. But, if sensation diminishes as narcosis increases, there certainly will be less severe and less sudden pain in partial anæsthesia than in case of no anæsthesia. In other words, there must be less liability to concussion or shock in partial narcosis than when chloroform has not been given at all. This is inevitable, and forcibly demonstrates the fallacy of the theory advanced by such theorists. Therefore, partial anæsthesia by the use of ærated chloroform, aerated ether or any other suitable narcotic preparation, does not enhance the dangers to life from the operation, but on the contrary diminishes the dangers. However, if the administrator of the anæsthetic neglects to describe its sensations in the periphery, in the fingers, hands, knees and body, the patient may mistake these for the approach of death and be so frightened as to produce concussion, or sudden arrestation of the circulation of animo-electricity or nervo-vital fluid in the inhibitory nerve, and death may be the result. But the result is not due to the partial narcosis, but mainly to the neglect of the administrator and more directly to the fright. Yet in complete or profound anæsthesia the patient passes through the very same experience, and therefore partial anæsthesia cannot be more dangerous from that cause than profound anæsthesia, and there must be less danger from the operation with partial narcosis than without any narcosis.

Again, we have only to call attention to Dr. Reeve's own language to show, that he does not understand, or know what he is talking about. He says: "Far more important than all, however, is the fact that the induction of anæsthesia for tooth-drawing is likely to be incomplete." Does the Doctor not know that the word anæsthesia represents condition? Anæsthetics are inducted to produce the condition known as Anæsthesia. This is not a *lapsus lingue* or slip of the pen, but a deliberate statement from an asssumed educator of the dental profession. Other statements equally intelligent may receive attention in a future article, as well as the paper to which the Doctor refers in his caution against the use of ether by the dental profession.

SYNOPSIS OF A LECTURE ON SYPHILIS BEFORE THE CLASSES IN THE DENTAL COLLEGE OF THE UNIVERSITY OF MICHIGAN.

BY C. G. DARLING, M. D.

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Thousands of volumes have been written on the subject of syphilis, enough, it would seem, to leave us without a doubt concerning its origin, course and treatment.

It has been no small task to select from the mass of literature available the few points about syphilis which are essential to you, that you may understand its course and nature, as you will find it in your practice. We must, first of all, put away the idea that syphilis is essentially and only a venereral disease, and remember the fact, that the innocent may suffer from it as well as the guilty.

Syphilis, says a recent author, interests everybody ; in the first place, those who have it, a very appreciative audience, and then those who are not affected by it, that is to say those who run the risk of acquiring it. This disease may be said to precede all written history, and strange it may appear that the record has been left upon the teeth of human beings who lived and died ages ago.

The imprints of hereditary syphilis upon the teeth are so lasting and characteristic that the original appearance may be preserved and read after centuries have elapsed. Those who have taken the trouble to study prehistoric bones say that the history of syphilis is written in every country upon the earth.

In 1887 there were, in the Musee Boca, four skulls bearing undoubted marks of syphilis. All of the skulls are of undoubted antiquity. Suffice it to say, that these relics teach us that syphilis existed in Peru before America was discovered, and the disease was common in that country, for many children's skulls bear evidence of it. Research shows that it was no uncommon disease among the North American Indians before the discovery of America by

Columbus, though it is improbable that it was carried to Europe from this country, as some would have us believe, for at one time it was known in European countries as the "American Evil."

When you have been engaged in your work of caring for the teeth, have you ever thought there might be written upon them such pages of history?

Parrot says: "These proofs are superior in certainty to those derived from written documents, and from them we learn that syphilis is probably the most ancient disease of man." Opponents of this theory say that other lesions of the bones and teeth exist than those of syphilis, and that the disease may have undergone many changes since the early period from which we think we can read it. Its written history, which dates back many centuries, shows no change unless it be such modifications as we can show in individual cases by well-directed treatment.

The earliest writings of the Chinese contain a fair history of the disease, which, if true, would indicate that the disease was known in that country two thousand years ago.

Egypt claims the distinction of possessing a fair amount of the disease fourteen centuries B. C.; while Japan has a record written in the ninth century.

The Bible is said to abound with many vague references to the disease, although no true or full description is given. Whatever may have been its history in ancient times does not concern us, but it suddenly came into prominence as an epidemic in 1492, when it was spoken of in France as the "Malady of Naples," because the French soldiers were supposed to have brought it from that place when they returned from one of their invasions. In a few years it found to exist in all countries of Europe, pervading every rank of society. Its source was not recognized at first, but was attributed to the evil influence of the stars; all writers of the time joined in saying they had never seen anything like it.

During the centuries which followed, all venereal diseases were classed together without distinction, and it was not until 1852 that they were strictly classified, and syphilis received the proper consideration which it demands as a disease.

WHAT IS SYPHILIS?

Syphilis is an infectious, constitutional disease, probably due to a micro-organism, which enters the system by the blood and lymphatics, pursuing a chronic course.

It attacks, primarily, the connective tissue, but no tissue in the body is exempt from its ravages, and no organ is so strong that it may not be invaded by this disease.

It is not necessarily a veneral disease; all that is required to infect the healthy individual is to place some of the blood, discharge or secretions containing the virus upon an abraded surface, or a surface capable of absorption, and the work is done.

The conclusions that syphilis depends on a micro-organism for its transmission have not been positively proven, though in the year 1884 Lustgarten found a bacillus in an initial lesion and in a gumma. He described them as "slightly-curved rods in the interior of nucleated cells." While the disease is usually contracted by persons holding improper relations, there is no person who does not at some time run the risk of accidental infection. The point where the virus is planted developes in time certain peculiar phenomena. This point bears the name of initial lesion, because it is the first marked indication that the bearer has been infected. The secretion from the initial lesion is highly contagious, and is the most common source from which the virsus is derived; though secretions from secondary lesions, the blood and lymph, during the secondary stage, are also contagious, while the tears, milk, sweat and saliva are not contagious unless mixed with blood or some of the secretions.

The infection is usually direct, commonly by cohabitation, while mouth-to-mouth infection, the result of kissing, is more frequent than would be supposed.

Newmann published a carefully prepared report of cases, where the primary lesion was in other locations than on the genital organs. Eighty-four were reported, of which forty-six were on the lips, some were on the tonsils, others were the tongue and in the pharynx.

Taylor, in a recent article, mentions two cases occurring in the practice of physicians who contracted it in examination of a body soon after death.

Another found chancres on the scalp conveyed by using a copper comb which was borrowed from a syphilitic friend.

Brousse saw a case where there were seven chancres on the face; these were doubtless caused by using a razor which had recently been used upon a syphilitic individual.

Primary sores on the lips or within the mouth may be caused by transferring the disease by cigars where the maker, a syphilitic, has moistened them with saliva that he may nicely turn the end; it may also be conveyed by pipes which are passed from mouth to mouth, tooth-brushes, chewing-gum, whistles, drinking vessels that are in common use, razors, towels, by operations and instruments. Glass-blowers, by using the same pipe in common, occasionally become infected. It matters not the source of infection, whether from primary or secondary lesions, or where the primary lesion may be located, the course and duration are essentially the same.

Dr. Bulkley has recently reported some interesting cases of the unusual ways in which syphilis may be contracted. Out of fifteen hundred cases seen by him, sixty-five had the primary lesion at other points than on the genitals. Thirty-four of these were males and thirty-one were females. In thirty cases the chancre was on the lips, in seven the fingers (the dentist will please recall this when he is examining the mouth of his many patients), six on the breast, six on the tonsil, five on the tongue, three on the cheek, two on the chin, one on the ear, one on the forearm and one on the hand. He further states that forty per cent. of his female patients had innocently contracted the disease. He found one case where the disease was contracted by wearing a bathing-suit which retained the virus from the person who had previously worn it.

Bedding, canes, toilet articles and even opera-glasses have been known to convey the disease. Another, where the chancre was on the tongue, contracted the disease by holding pins in her mouth. The patient was engaged in a business (fitting garments) where a number of pins were used, and formed the uncleanly habit of putting them in her mouth.

Physicians and dentists may convey it from one person to another by the caustic holder, or by instruments where they are not properly disinfected. Biting and tooth wounds may convey the disease. The largest chancre ever seen was on the ear of a man who had been bitten in a fight. Pinching and scratching may also be added to the ways of infection. The nursing of infants where the breast has a syphilitic lesion becomes a source of infection to the child also. A mother nursed two children, her own and a foundling, giving to each a breast, in due time the foundling died from a well-defined hereditary syphilis; she then gave her child both breasts; in time the parent and child both developed syphilis. Numerous are the instances where phpsicians and dentists have contracted the disease while attending to their professional duties. One case is mentioned of a lady who contracted the disease while dressing the eye of a friend who had syphilis. Rubbing the eyes, picking the nose, or carrying soiled fingers to the lips, may be sufficient to produce chancre and all of its followers. Physicians or dentists may contract it while examining the mouth and throat of syphilitic patients; the patient coughs, projecting some of the virus upon the face, it may fall upon the lip or eye and begin its lasting course.

In Russia a "female pretender" infected a large number of persons by removing foreign bodies from the eye by the tip of the tongue; on the tip of her tongue was a well-developed chancre.

Thus we find everywhere unseen danger, the only wonder we can express is that infection is not more common. You must be ever on the alert, not only to save your patients from infection, but to save yourself, your family and future generations.

The course of syphilis, for the convenience of study, may be divided into three stages: the primary, secondary and tertiary, each period being characterized by well-marked symptoms; though the change from one to the other is so gradual that it can hardly be said that one period has ended and another begun, the stages not being sharply defined. The first stage has two well-defined periods: the period of incubation—from the time of infection to the appearance of the chancre; the second period extends from the appearance of the primary lesion, or chancre, to the development of the constitutional conditions. The lesions occurring in the primary stage are, the initial lesion and induration of the lymphatic glands. The secondary stage is one of constitutional manifestation, and is frequently ushered in with fever. During this stage there will be various lesions of the skin and mucous membrane, the eyes and lymphatics, particularly the latter, will be involved, superficial ulcers will appear in the mouth and on the tonsil, though the patient is scarcely aware that his throat is sore. The duration of this period will depend much upon the habits and life of the patient and the thoroughness with which he carries on the properly directed treatment. The tertiary stage may be entirely avoided or never develop if the patient carefully conducts his life and follows the improved methods of treatment during the early stages. When allowed to pursue its course the disease may develop gummata, and ulcerative lesions, destructive disease of the bones and various affections of the nervous system.

The period of incubation is variable. According to the statistics of Diday, it may vary from twenty-five days to one hundred and twenty-five days, the average period being forty-five days. It never occurs later than six months, rarely it happens that a case is reported with a period of incubation lasting ninety days. During this period no sign or sympton betrays the presence of the disease, but soon a change takes place at the point where the virus penetrated, and only at that point. The tissues at this point pass through a series of changes and in time return to their natural condition.

The point is called the initial lesion and for a time is the only expression of the disease. The first lesion of syphilis is called chancre, sometimes called primary syphilitic ulcer, initial sclerosis or Hunterian chancre.

Whether infection be derived from chancre or a secondary lesion, the primary lesion is always the same and may appear upon any part of the body that is exposed to the virus.

There are four recognized forms or appearances which the initial lesion may present: First, erosion; second, the silvery spot; third, the dry papule; fourth, follicular chancre.

Du Castel states that he twice saw the development of chancre. In one case it appeared as a small red spot, which after several hours turned into a papule. The second became a papule ten hours after its first appearance. The small red spot begins as an erosion, the epithelium is raised and a serous secretion takes place beneath it. Sometimes the epithelium is raised and secretion takes place without a redness. The lesion increases slowly, presenting the appearance known as the "silvery spot," so typical of this form of chancre. This secretion disappears, and when it passes away rapidly, either by exposure or absorption, the surface left may be flat or convex, of a brown or brownish-red color; this forms the dry papule. The follicular variety is not so common as the other forms, is pinkish and elevated; as it increases in size it bcomes red in color; it does not require a long time for the lesion to develop into a superficial erosion. The epithelium is destroyed, the floor slightly eroded, while the walls slope gradually, not being very clearly cut; it is usually round or oval, but may assume any shape; it may vary greatly in size from a line to a full inch in diameter when well hardened and fully developed. The secretion at first is serous until the sore is irritated or infected with pus microbes, then suppuration begins. Induration is a very important element in the development of chancre, and begins usually in the first week, not later than two or three weeks; this begins first in the mucous membrane surrounding the sore, and gradually extends to the cellular tissue beneath.

The induration is slight at first, but continues to increase until the chancre begins to heal, when it gradually disappears. The change is probably due to the formation of granulation tissue, though the inflammation is never acute, and is gradually removed by absorption.

Chancres on mucous surfaces rarely leave a scar, while those on the skin remain for years, a shining mark with pigmented edges. Much of the scar depends on suppuration and the destruction of tissue.

The neighboring lymphatic glands become indurated, but the skin covering them does not change color. These glands do not become united, are hard, movable and painless. They rarely suppurate unless they are injured. Only one gland may be affected, or a chain of glands may become indurated; they gradually resume their normal condition after the disappearance of the chancre. When chancre is on the lip or chin, the submaxillary lymphatic is enlarged. When chancre is on the tongue, search for enlargement of the subhyoid glands. Chancre on the eyelid is accompanied by enlargement of the peri auricular glands. Chancre on the finger or forearm by enlargement of the epitrochlear glands, the axillary glands will also show some enlargement; these glands will be enlarged when the chancre is on the breast. Chancre is usually solitary, but more than one may appear if more than one point is inoculated at the same time. When chancre appears on the lip, it is usually considered a trifling lesion; it may first appear as a small crack but gradually grows, becomes raised, and may be crusted over by the dried secretions; there is lack of pain, but after ten or fifteen days the swelling of the submaxillary glands adds weight to the diagnosis.—*Dental Register*.

PYORRHŒA ALVEOLARIS.[1]

BY DR. EDGAR F. STEVENS, BOSTON, MASS.

Writers of twenty years ago seldom mention pyorrhœa alveolaris as occurring in patients under thirty, while at the present time we see indications of it in those under eighteen. Why this is the case is not clear to my mind. We find it in patients who live on plain food as often as in those of luxurious diet; in those who are in a good physical condition as frequently as in those of feeble health; in patients suffering from nasal catarrh no more than in those who are not.

Usually, I believe, the trouble has originated from a simple deposition of salivary calculus, which, we know, is first deposited at the margin of the gum, in close proximity to the ducts of the salivary glands. As this deposit is added to, the gum is forced away from the tooth, and the constant irritation caused by this deposit and by forcing food against the gum in mastication soon develops inflammation, nutrition is interfered with, and we have a breaking down of the connective-tissue corpuscles with formation of pus; the teeth become loose, elongated, and forced out of place, especially the tissues about the lower incisors, which become so swollen as to have the appearance of abscess; finally, a breaking down of the bony tissue of the alveolus takes place. This condition often spreads to adjacent teeth, which were, perhaps, free from deposit, and the entire set may be involved. In extreme cases we may have more or less systemic disturbance, as fever, loss of appetite, and digestive trouble, probably largely due to the amount of pus which must be taken into the stomach with food.

In treating these conditions, thoroughness in cleansing is of the greatest importance; in the first place, the deposit must be entirely removed by properly-shaped instruments. It is not well to attempt to complete the treatment at the first sitting, but be thorough in what is done. After the deposit is dislodged from the root, wash out the pocket with warm water, and if the alveolus is involved, use engine-burs to cut away until healthy bone is found, then rinse with hydrogen peroxide, and after being sure all *debris* is removed, protect the soft tissues with napkins, and with a Donaldson broach wound with cotton apply caustic paste to the socket as far down as can be reached. Wait two or three minutes, then rinse with warm water, and pack tannin and glycerine paste in the socket. If the pocket is very deep, lance from top to bottom; this will not give pain, as the caustic paste has obtunded the parts. If the teeth are very loose, tie with silk ligature, weaving in and out, so as to make a strong support.

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[1] Read before the Harvard Odontological Society, October 29, 1891, by Dr. W. E. Boardman.

In dismissing patient until next appointment (which should be in two or three days), be sure to impress upon his mind the importance of absolute cleanliness on his part; let him rinse his mouth several times a day with a wash containing half a drachm each of carbolic acid and liquid potassæ in a pint of distilled water. For a tonic, something like Wyeth triple phosphates, or cinchonidia, two-grain pills three times a day, and keep the bowels free by cathartics. At the second sitting, carefully remove whatever deposit was not dislodged at first, and inject hydrogen peroxide into the socket, after which burn out the dead or diseased tissue with the caustic paste, rinse with warm water, and pack as before with tannin and glycerine. As a rule, the brush has been used too sparingly, and we can now do a little teaching as to what we mean by thorough and faithful cleaning; this will bear its fruit at the next appointment.

The number of times a patient requires to be seen depends entirely on conditions, but, as a rule, after the gums have been satisfactorily treated and brought into a condition of comfort, it will not be necessary to see the patient oftener than once in three or four months. I do not claim to always cure this trouble, but where the socket has not been extensively destroyed, we can make the parts comparatively healthy.

There is another condition met with where the gum has receded without a deposit being found, which affects particularly the lower incisors and upper and lower cuspids. It is characterized by a retraction of the gum margin while still holding tightly to the root; there are no signs of inflammation, being simply an atrophy of the parts which probably has a constitutional or hereditary origin. Mechanical means to overcome this trouble cannot be used; we must recommend proper cleansing and systemic tonics.

In cases where the posterior teeth have been lost and the anterior teeth have been forced out of line, I would, as a rule, extract.

Sometimes we meet cases where the incisors have elongated and been pushed outward, perhaps the other teeth are in a condition to be treated and saved, but there is no help for the incisors, for if treatment is commenced they will continue to elongate and spread, and may as well be removed at once.—*International Dental Journal.*

"IN SIMPLICI SALUS."

Hippocrates proclaimed that "accurate observation of facts, and correct generalization from them, forms the only rational basis of medicine," and so we are taught to-day. To discover truth in science, the most learned will admit, is very often difficult, but in no science is it more difficult than in medicine. Independent of the common defects of medical evidence, our self-interest, or self-esteem, our prejudices, our likes and dislikes, and not infrequently our ignorance, only too often hide the truth from our view, and we ascribe too much to art, and too little to the operations of nature. Thus the mass of testimony is most with art, and although we believe we are right in our reasoning, we only pursue the old, time-honored course that has been instilled into our minds through raining and education. The best and safest practitioner is he who knows when to abstain from acting as well as when to act; in other words, who has learned when and to what extent the case can be left to the salutary processes of nature. The tendency to recovery which manifests itself under different modes of treatment, and even in spite of opposite modes, has induced in some minds a degree of skepticism as to the utility of any remedies. That the opposite error to that of mischievous or meddlesome activity may likewise be easily carried far, is at once apparent. It does not follow because the majority of diseases, such as continued fevers and acute affections generally get well, with or without the administration of medicine, that therefore the disease should be abandoned to what Cullen calls the "*vis medicatrix naturae*."

A knowledge of the circumstances upon which health depends, is one of the most important parts of the moral and intellectual education of the true physician. The essentials necessary to the attainment of health are:

1. The inheritance of a healthy constitution.
2. Pure atmosphere and water.
3. Wholesome food in quantity and quality.
4. Freedom from contagious and infectious diseases.

Either of these primitive essentials of health, is controlled but little, if any, by the individual efforts of man. To medical science solely must mankind look for the foundation rock from whence the principles governing these essentials of nature's law, are to be revealed by virtue of intelligent, progressive, active, zealous and truly conscientious physicians, who will, sooner or later, succeed in educating the legislator to understand and realize the fact paramount that only through the State or municipal government can we ever hope to see mankind enjoy these blessings. Nature puts into our hands the means of preserving health and this gift involves responsibility. Health will be counted among those talents for the use of which we are to answer to our Creator, and it is our duty to become fully acquainted with the laws which regulate and govern it.

Experience teaches that disease, as well as health, is controlled by nature, that her laws must be consulted if we would practice successfully. But alas! how often do we find—even in this most enlightened age of science—the truth as expressed by the late Prof. Chapman, "That many physicians are given to profound thought, and possess extensive knowledge, united with sterling honesty, being by nature endowed with the highest order of talents, and yet be wanting in good common sense." The most experienced, close observing, earnest searchers after truth in nature's operations, most skillful and best physicians, hesitste above all things to give large quantities of medicine, and proclaim the best way to help the invalid to health is simply to "assist nature." The writings of Dr. Benjamin Rush, Shippen, Chapman, Radcliffe, Bostwich, Dumoulin and Oliver Wendell Holmes, Sir Asley Cooper, Sir Wm. Gull, and numerous other shining lights, are too well known to need reiteration, but are simply called to mind as evidence that the more matured minds in the profession are guided by the light of nature's *in simplici salus*.—Editorial in *Amer. Asso. Jour. of Medicine.*

Personal health, which makes one unacceptable or disagreeable, demands careful attention. Bad breath is especially disagreeable, and can generally be avoided. When a disagreeable breath results from objectionable and filthy habits, it ought not to be tolerated for a moment by any self-respecting person.

A well known dentist was called on by a colored girl for some dental treatment, and because of the careful toilet preparation he made before and during the treatment, he so impressed the girl that she related the fact in the wealthy home where she lived, and as a result, a large and wealthy connection became the dentist's patrons.—J. TAFT, in *Ohio Journal.*

TUMORS OF THE MOUTH.

BY J. TAFF, D. D. S.

Read before the Seventh District Dental Society of Ohio, May 17, 1882.

The mouth is a part of the human organism that is subject to a variety of diseased conditions, all of which are likely to come under the observation of the dentist. These affections may be of the most simple variety of inflammation, accompanied by suppuration and mild forms of ulceration, but they are oftentimes found in more serious or violent forms.

Tumors of great variety are likely to occur in the mouth, perhaps, the more simple form of these is that usually denominated "epulis," which term simply means, upon or springing from the gums. These more frequently are simply benign growths varying in consistence from merely a fungoid form to that which may be very firm and resistant. They sometimes consist of simply one large lobe or mass; in others they are lobulated, consisting of two or more miniature lobes, either but little, and in some cases, very markedly fissured. They are sometimes of very rapid growth, and in others quite slow; months, even years, sometimes being required for any considerable development; in other instances they spring into considerable prominence within a few weeks time. They usually start from the margins of the gums, between two or more teeth, sometimes enveloping the free margin along two or more teeth, Their structure varies very greatly, sometimes it consists simply of a fungoid mass, very freely ramified by blood vessels, and still very poorly organized. In others to be less vascular more dense, of a myeloid character with little or no apparent organization. In the growths of medium, or less rapid formation, they are oftimes found of fibrous character throughout, a good degree of organization being effected. These are more dense and resistant than those already mentioned. These tumors are well nigh, if not altogether, cartilagenous, having a very small amount of blood supply. None of these tumors cause persistent pain, and very seldom any appreciable soreness.

The attachment of the more vascular varieties will usually be by a small base, sometimes, often little more than a thread-like attachment, through which an artery and vein pass. Others will have larger attachments or broader base, and extend deeper into the structure, and be more likely to involve the surrounding and deeper structures; in such the diameter of the attachment may be larger than the tumor; elsewhere this variety of tumors may grow to a large size, and not in any serious extent involve the adjacent tissues. It is very seldom indeed that this simple form of tumors becomes attached to the bony tissues; such occurence would only be likely to take place where the growth was of long standing and persistent development.

The circulation through these tumors is oftimes so nearly normal as to cause but little, if any, change to the color of the mucous membrane enveloping them, In all cases, however, where there is greatly increased vascularity, there will be heightening of color, and sometimes a purple hue is presented; this depending upon the sluggish character of the circulation. In a well nourished and vigorous constitution, these growths will be less rapid and less likely to encroach upon structures much beneath the surface. In studying and dealing with these growths, it should not be forgotten that in favorable circumstances with a low grade of vitality and a strumous cachenia that a more or less malignant character may be assumed; they, like many other things, will proliferate and grow in a favorable soil. The lower the tone of the system, the less perfect the nutrition, and especially if there is present some special vitiation, the greater is the liability to such growths.

It is not always an easy matter to determine the origin or cause; in some cases there is no difficulty in this respect, in others the origin is very obscure. They are sometimes found upon the gum beneath which there is an accumulation of salivary calculus, in others an accumulation of other offensive material, I do not remember of ever having seen a case of epulis occurring because of pyorrhœa alveolaris, but they do occur upon diseased gums, induced by roots of teeth, oftentimes the merest remnant will be sufficient to do this. In nearly all cases where these tumors exist upon the gum in connection with sound teeth, there will be somewhat of separation of the gum from the neck of the tooth, but usually little or no suppuration.

TREATMENT OF THESE TUMORS.

Proceeding with special interference to treatment of these tumors, the true character in every case should be thoroughly understood. If of the more simple forms with small or comparatively small basal attachment, a prompt removal may be made with the scissors or knife, seizing the growth with a pair of toothed forceps make a clean cut from the bottom, remove the whole in one mass, there will always be some hemorrhage; in the more vascular varieties, this may seem in some instances to be almost alarming; blood will spurt with considerable force from the vessels, in some cases, exhibiting an arterial pulsation, in other cases, though flowing very freely, will be continuous or without the intermittent character. This, however, is usually easily arrested by the use of proper hæmostatics and with compression. If the base is larger, and the tumor seemingly very vascular, a very effective and perhaps less objectionable way to remove it is by ligation, which results simply in strangulation; when sloughing will ensue and the tumor be removed. The principal objection to this method of procedure, however, is that all the tissue involved will not be so certainly removed as would be in the use of knife or scissors; but with the ligature, there is very little liability of hemorrhage, unless there is a hemorrhagic tendency. Such a predisposition should always be ascertained before proceeding with even the most trivial operation of that sort.

These tumors having the large attachment give the greater difficulty in their removal, and special care should be exercised in such cases, for they are more likely to involve the tissues more deeply.

Another method of treatment of certain forms of these growths, is by injection of some preparation that will either coagulate the contents of the tumor, and so interfere with the circulation, that its support and growth cannot be longer maintained, or by some material that will destroy the nutrient property of the plasm in the growth. Whenever in these structures the nutrient supply is cut off or markedly interfered with, there will not only be an arrest of the growth, but nature at once sets up a process for eradication. A solution of carbolic acid and iodine, the strength of which should be determined by the recognized conditions present, may be used in many cases with very good results. A solution of creosote and tannic acid, has been employed by some, but it perhaps possesses no advantage over the preparation first mentioned. Electrolysis may be employed in some cases, with prompt and successful results. In large vascular tumors of this variety, with sluggish circulation and increased color, this method may be employed with very decided benefit; this process is accomplished by the use of the ordinary battery, connected with the electrolytic needles; these passed into the tumor, but not brought in contact, and the current being made to pass through from three to eight minutes. This exercises a destructive influence upon the nutrient material, and the mass will slough away.—*Dental Register.*

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NITROUS OXIDE GAS.

REPLY TO AN EDITORIAL, BY DR. G. Q. COLTON, NEW YORK, AND THE EDITOR'S REPLY.

Editor of the Dental and Surgical Microcosm:

In your January number there appears an editorial article making a violent attack on nitrous oxide gas as an anæsthetic, which is as full of errors as an egg is of meat.

The *premises* from which you draw your conclusions, are entirely erroneous, as I will endeavor to show.

You state, "Therefore, nitrous oxide will neither support combustion nor sustain either vegetable or animal life." Again you say, "We can produce asphyxia and death just as soon and no sooner with nitrogen gas, or carbonic acid gas, or olyphiant gas, as with nitrous oxide gas." Not a supporter of combustion! On the contrary, next to pure oxygen, it is the most powerful supporter of combustion in nature.

I presume you will agree in the statement that any gas that supports a flame (combustion) supports life; any gas that extinguishes a flame, will extinguish life. Now strike a match and thrust it into a jar of nitrous oxide gas, and the combustion is intense. Light it again, and thrust it into a jar containing carbonic acid gas, and it is instantly extinguished.

Go to any dentist that makes a pure article of nitrous oxide gas, and ask him to allow a little stream to flow out. Light a match and let it burn till a live coal appears on the end, then blow out the flame and put the live coal into the little stream of gas, and the combustion is so intense that it bursts it again into a flame. Yet you tell us that nitrous oxide gas is not a supporter of combustion.

[My Dear Doctor:—Do you not recognize the fact that when you apply the nitrous oxide gas to a piece of heated charcoal, or a lighted match to the gas that you apply sufficient heat to, decompose the two chemical elements and set the oxygen free, and that it is the oxygen set free, that supports the combustion and not the nitrous oxide gas? There is not sufficient heat in an animal or a vegetable to decompose the chemical combination, and hence, it cannot support combustion nor sustain life.—Ed.]

You say that when the nitrous oxide is administered for the purpose of producing anæsthesia, the oxygen is not absorbed by the blood in the lungs, and therefore the effect is to produce asphyxia. We all agree that asphyxia results from cutting off the necessary supply of oxygen to the lungs.

Now the ablest work on anæsthetics, I have seen was written some years since by Prof. Ziegler, of Philadelphia. The Professor treats of chloroform, ether, nitrous oxide, &c. In view of the danger of producing asphyxia in the administration of chloroform, he says, it should never be administered unless you have some nitrous oxide present to *restore the patient* in case asphyxia is threatened. What! give a gas that produces asphyxia to restore a patient threatened with asphyxia! The only way to restore a patient threatened with asphyxia, is to supply oxygen to the lungs as quick as possible. The nitrous oxide does it quicker than atmospheric air, because it contains a larger portion of oxygen. And yet you say the oxygen in the gas is not absorbed by the blood in the lungs.

[Did anybody ever know of any patient being resuscitated from an asphyxiated condition by the administration of nitrous oxide gas? If small animals cannot live longer—on an average—than one minute and twenty seconds in an atmosphere of nitrous oxide gas, which has been abundantly demonstrated by the New York Medical Society, the Medico-Chirurgical Society of England, the Buffalo Dental Sociecy, and by myself on various occasions; then in the name of *common sense*, how can it resuscitate an asphyxiated patient? This simply shows how little Prof. Ziegler knows of what he was assuming to teach others. He most manifestly either did not understand the nature and properties of nitrous oxide gas, or what physical condition properly constitutes asphyxia and the cause of it, or both.—Ed.]

When Mrs. Peter Cooper was dying she had not sufficient vitality to draw enough air into the lungs to supply the necessary quantity of oxygen, and was gasping in great distress. The friends rushed over to Prof. R. Ogden Doremus, the distinguished chemist, of the New York College, to get some oxygen to throw into the room. Prof. Doremus told them it was not oxygen they wanted, for it would not be absorbed by the blood or but slightly. "What you want," said he, "is the nitrous oxide gas, for that is readily absorbed by the lungs." They then went to my office, got up the janitor (it was night) and drew off 180 galllons of gas in large India rubber bags. The whole of this was pressed out into the room of Mrs. Cooper. Ex-Mayor Hewitt, Mrs. Cooper's son-in-law, called on me the next day, and said the gas had afforded immediate relief, that all gasping was stopped and Mrs. Cooper was rendered comfortable during her last hours, and this was apparent to every one present.

And now, my good sir, was not the oxygen in the gas absorbed by the lungs in this case? How otherwise can we explain the relief afforded?

[This remarkable phenomena of Mrs. Peter Cooper in her dying hours not having sufficient vitality to breathe and gasping in great distress, has been witnessed again, and again by more than a hundred thousand physicians and dentists all over the world, of women in distress and mental agony. Anything to soothe the mind and inspire hope! Even though it be nitrous oxide, which can by its administration only rob the blood of the *force* of *life* (free oxygen) which should be received with the atmosphere. No wonder that the "ex-Mayor" said that the gas had afforded immediate *relief*—that all gasping stopped, for life itself soon took its leave. If the lady had been permitted to breathe pure atmospheric air, she might be living still. But what a sad comment upon the distinguished Prof. R. Ogden Doremus? *Distinguished* for what? His lack of knowledge of chemistry and its fundamental laws. Not oxygen wanted, but *nitrous oxide;* not *life* but death, and death came with all its quieting effects, as it did to Bernard Mohan of Pittsburg recently from the use of nitrous oxide gas, and to many others not only in this country but in Europe.—Ed.]

You say, "In nitrous oxide gas we have no *free oxyen*, nor even oxygen." These are your words. The atmospheric air is composed (in round numbers) of four parts of nitrogen and one of oxygen. In this gas we have (by volume) two parts of nitrogen and one of oxygen, *not* one part oxygen and two of nitrogen, as you state. [This sentence is yours *verbatim*, but again we are too stupid to comprehend.—Ed.] In atomic proportions the parts are just equal. You deny that the gas can produce anæsthesia simply because the blood in the lungs will not absorb it, and therefore, like chloroform, it produces asphyxia. How long will a man live if his breath is nothing but nitrogen gas, or carbonic acid gas? Just as long and no longer than he would if his head were thrust under water.

[Here again, you are in error, as we have demonstrated by practical application that animals will live more than five times as long under water as they will in an atmosphere of nitrous oxide gas, nitrogen gas, carbonic acid gas, or olyphent gas. Why will they live so much longer? Simply, because, when in the gas the gas enters not only the lungs but the blood. When in the blood (no two elements occupy the same space at the same time) it causes the oxygen to be eliminated so much more rapidly. But when in the water, true the water gets into the lungs, but it does not enter the blood, and the oxygen remains so much longer to support combustion and sustain life.—Ed.]

When traveling in Europe, Dr. J. Marian Sims requested me to give the gas for the removal of a cancer from the breast. He invited Baron Lang, the chief surgeon of the French army, and a number of leading surgeons of the hospitals of Paris, to witness the operation. I kept the lady asleep sixteen minutes, and till the operation was completed. When she awoke she appeared as fresh as before taking the gas. She stated that she had experienced no pain at all. All present expressed themselves surprised and pleased with the operation. I have twice kept a patient asleep forty-five minutes.

[We freely admit that asphyxia may be maintained a considerable length of time by admitting enough, and just enough atmospheric air to sustain life, after asphyxia is obtained, but it may be said *truthfully* that when that is done the patient is held right on the death line and that if you happen to carry the patient over that line your patient is gone and all the powers of earth can't save. I care not to travel on that line. Others more reckless and venturesome may. Nor is it any evidence that nitrous oxide does not produce asphyxia, or that it supports life, that it may have been administered to tens of thousands without causing death.—Ed.]

When a surgeon commences to give chloroform to a patient for an operation, the circulation of the blood, is partially arrested, and when a state of insensibility is reached, the heart-beats are not over twenty or twenty-five in a minute, and this simply because the usual supply of oxygen is cut off from the lungs.

Now when we administer nitrous oxide the pulse begins to *go up* instead of down, and this simply because we supply oxygen more rapidly to the lungs than is supplied by the air, and when the patient reaches a profound anæsthetic sleep the pulse is *fuller*, *stronger* and *faster* by from fifteen to twenty beats in a minute than when breathing the common air. How do yon account for this fact? You say the oxygen in gas is not absorbed by the lungs. If it were not, the effect on the circulation, would be the same as with chloroform. With chloroform some air *must* be admitted, or the patient is killed at once. The nitrous oxide is administered with *no* admission of common air, before the anæsthetic condition is reached. You state that patients under the influence of nitrous oxide turn pale. It is true; but why? Is it because the blood stops circulating, as in ordinary cases of sudden paleness? No. It is because the circulation is *suddenly increased.* If you were to run a block or two rapidly, or if you were to run up three or four flights of stairs, you look pale at the top. By the muscular action you have started the blood into quick circulation. It always starts from the heart and is thrown into the arteries and drawn from the surface; hence the paleness. Stand at the top of the stairs for a minute or two, till the blood in returning to the heart passes through the little capillary vessels, and you have more color than before you started. It is just so in the administration of nitrous oxide gas. By the extra supply of oxygen the blood in the lungs, is prepared more rapidly for circulation. It is thrown into the arteries and drawn from the surface; hence the paleness. A moment or two after the operation is completed, the patient has more color than before inhaling it.

You speak of blueness in the face. This is sometimes seen, though seldom. What is the reason of this? We have started the blood into quick circulation, and thrown it into the arteries. In returning to the heart it has to pass through the little capillary vessels; these vessels have not got accustomed to deliver it as fast as received, and there is a slight engorgement, a damming up. In fifteen seconds, when we commence operations, it all disappears. Now, if it were *general* congestion, it would not as suddenly disappear. It is merely local and confined to these small capillary vessels.

[Here again we must remind you that you fail to recognize the true cause of the results to which you refer. It must be evident to any one who properly thinks, that when the pulse weakens or grows less frequent, the force that moves the muscles of the heart must be diminished. Then whence cometh that force? It will not answer to say that life is that force. Life is not force; neither is force *life*. But *force* may make *life* manifest. The muscles have no force in and of themselves. They are only mechanical. The force that moves any organ, may properly be called electric force. This animo-electricity generated from the basic element oxygen by the cerebral glands of the brain, must pass out from the brain—the great heart of the nervous system—into all the motor nerves of any and all the organs of the body in normal quantity, to enable any, or all the organs to perform their functions normally. Also, it must return to the brain—the great galvanic battery of the animal motor—in normal quantity in order that these organs of sensation may perform their functions normally. Any change in the flow of this animo-electricity, will change the functions of these organs. Hence, arterial and veinous circulation is dependent on neural circulation. But neural circulation in any motor nerve or set of nerves, is dependent to a greater or less extent upon the action of the mind. The mind may be designated the governor of this electric battery. This spirit force operates upon material force and thus moves matter. Just how it operates upon certain cells of the brain to send out the electricity into the precise nerve, or nerves that are used to move certain organs, we may not be able to comprehend. But the fact that it does operate thus to produce these desired results is nevertheless true. To illustrate—the mind conceives of a tune; it is brought to bear (by that attribute that we call the will) upon certain cells of this brain or battery, to send out the animo-electricity into the nerves to make manifest the force necessary to move the desired organs to perform their functions, and thus spirit force operating upon and through material force moves matter—the physical man—to the piano stool and to the execution of this tune at the impulse of the will sending the electric current into the precise motor nerves that are wont to move the precise finger or fingers necessary to execute the tune and the evidence of this execution is brought back to the mind, (and only can be thus brought back) by the circulation of this same electricity in the sensory nerves to the brain and mind. This is not simply theory but recognized facts. Hence, we need not dwell upon the well-known fact, that the action of the mind, will and does influence and control the functions of any and all organs of the body. That during mental excitement or agony the pulse is more frequent and forcible, except in asphyxia, when it is weaker and less frequent—

in consequence of the loss of oxygen to the blood and brain; or in case of paralysis or partial paralysis, as in syncope, or by *concussion* produced either by the sudden action of the mind, or by an external agent—chemical or mechanical. Therefore, you are again in error when you say that "in producing anæsthesia with chloroform the heart-beats are not over twenty or twenty-five in a minute." You should recognize the fact that in this condition you have robbed the blood of necessary quantity of oxygen to support combustion and sustain life, and that, in point of fact, you do not have anæsthesia, but asphyxia, nor have you administered an anæsthetic. There can be no true anæsthetic without having sufficient free oxygen as the all-important element to sustain life. Chloroform or any other suitable narcotic cannot of itself produce anæsthesia. There absolutely must be sufficient air to supply in due quantum the red corpuscles of the blood, out of which, as the basic element, sufficient electricity is generated to enable the vital organs to perform their functions *normally*, or nearly so. Hence, you should recognize also the true cause of the increase of the pulse in the first stages of administration of nitrous oxide. Your patient is excited mentally. Super-add to that the fact that you are depriving your patient of the necessary element—free oxygen—to sustain life, and that inherent nature demands it, and that your patient is in physical and mental agony to obtain it. Is it possible that you, or any one else, could expect anything else than a quick and forcible pulse in your patients in this condition. If you placed your patients under the water you would have a similar pulse, during the same time. But you are unquestionably mistaken, or miss-state, when you say of nitrous oxide, "When the patient reaches a profound anæsthetic (?) sleep, the pulse is fuller, stronger, and faster by from fifteen to twenty beats in a minute than when breathing the common air." We will submit to the intelligence of the reader who has administered, or seen administered, nitrous oxide to profound asphyxia, as to whether you state the facts. Except in mental agony in an asphyxiated condition, the pulse is always weaker and less frequent. And this is true whether the asphyxia be caused by nitrous oxide gas, nitrogen gas, olyphent gas, ether, chloroform, or anything else that does not contain sufficient air to supply the necessary free oxygen.—Ed.]

You say: "Nitrous oxide gas acts by suspending one of the most important organic processes, that of respiration."

[You have enclosed this with quotation marks and say, "you say." Where and when did I ever use such language? Nitrous oxide gas, or nitrogen gas, or any other gas may be breathed without suspending respiration (some more freely than others) until you may have reached that advanced state of asphyxia wherein there is not sufficient force to move these vital organs; but notwithstanding the respiration, there is an utter lack of supply of the essential element to support combustion and sustain life. Again, to relieve of head-ache, it is only necessary to interrupt the neural current in the nerves of sensation leading from the region affected. This may be readily accomplished by robbing the blood of the free oxygen by the administration of this gas.

Again, your theory as to the cause of the pallor seen in the advanced state of asphyxia by the use of nitrons oxide gas, is most manifestly fallacious, as will be seen in its application to syncope and mental excitement. If the purpleness caused by the administration of this gas, is not, always seen, it is because of the thickness and condition of the skin and the difficulty of the blood to come to the surface. The blood is always black, or nearly so, caused by deoxidation; and the pallor is not a clear, white pallor, as would be in syncope or paralysis, but a bluish pallor, which is due to the blackness of the blood, and is death-like in appearance, as a result of the death-like condition of the patient.—Ed.]

This gas was discovered by Priestly—but it was first analyzed by Sir Humphrey Davy, in 1799—and proved that it was respirable. In his large work on the subject, Sir Humphrey Davy states that he often breathed it himself to relieve a head-ache. What! breathe a gas which is not "respirable," to remove a head-ache.

The impression produced by your article on one not posted on the subject, is that the inhalation of this gas is injurious to health. Well, I gave the gas to Dr. Horace Wells, of Hartford, Conn., on the 11th of December, 1844, for the extraction of the first tooth ever drawn without pain. This was the discovery of *anæsthesia*. The honor of the discovery belongs to Dr. Wells, I never claimed it.

The first experiment made with ether, was on the 30th of September, 1846. Dr. Gutherie of Sag Harbor discovered chloroform and Prof. Simpson, of Edinburgh, was the first to apply it, in the latter part of 1847, killing his patient.

The gas injurious to health! I have breathed it, with brief intervals, ever since 1844, and it has added ten years to my life. For the past twenty-eight years I have breathed on an average, twenty gallons a day. When in my office I breathe four or five deep inspirations, filling every air cell in my lungs to show patients how I wish them to commence, so that in the aggregate I breathe twenty gallons during the day. It keeps my lungs expanded and my blood thoroughly oxigenized and vitalized. No one puts down my age at over sixty, while many say fifty-five, though as a matter of fact I am in my *seventy-ninth year*, having been born February 7th, 1814. If the inhalation of this gas were injurious to health, I ought to have been dead twenty years ago.

I do not like the cylinder gas, which nearly all dentists use. Dentists are not chemists, and do not know how to make the gas, and so they buy the gas which is condensed in cylinders. It has to be allowed to expand into a bag or gasometer in order to be breathed. It answers very well for the extraction of one or two teeth, but for even this you have to give a very large dose. A single dose of gas, *properly made*, will answer for the extraction of ten or fifteen teeth or stumps.

The gas does *not* produce asphyxia, it produces an over exhilaration of the nerves and by this means momentarily suspends their normal function. It used to be called "exhilarating gas," a very good name for it, but how could it produce exhilaration, if the lungs did not absorb it?

You state that the gas will not "sustain either vegetable or animal life." Well, who ever said it sustained "vegetable life?"

A plant lives on carbonic acid gas, not oxygen.

New York, April 13, 1892. G. Q. COLTON.

[Nitrous oxide injurious to health! Most *assuredly* it is: If depriving of the life-sustaining element is injurious to health and does violence to the nervous and physical constitution, then the administration of nitrous oxide most certainly produces these sad results, and, in the language of the English savant, Dr. Richardson, "Its use for the pretended purpose of producing anæsthesia, should be prohibited by law." You say that by frequently taking this gas your life has been extended ten years. What authority have you for so saying? Might you not, with more than equal authority and evidence, say that if you had not been taking nitrous oxide gas, that you might have lived more than a hundred years? Why not? You are of good Puritan stock, and reputed to be a man of good, temperate habits. Then why not live a hundred or more years, if you had not been using this asphyxiating gas? Really, Doctor, does not your attempt to controvert the *uncontrovertible arguments* of the editorial to which you refer, consist largely of such hypothetical statements, telling what you have done with and for nitrous oxide, and what nitrous oxide has done for you? This may be all very well, and in perfect harmony with your efforts to popularize nitrous oxide gas, out of which you may have amassed great wealth. Yet such sophistry will not answer to establish the true character, properties and effects of nitrous oxide gas in its relation to the science of anæsthesia. When no animal, nor plant, can live any length of time in nitrous oxide gas, that at once settles the question as to its ability to produce anæsthesia. A plant cannot live without free oxygen, any more than can an animal. It is also true that a plant will die in an atmosphere of carbonic acid gas, as soon as it will in nitrous oxide gas, and no sooner. This we have also demonstrated by actual test: Carbon is food for the plant, but carbonic acid gas will not of itself sustain the life.—Ed.]

WE note that the American College of Dental Surgery, of Chicago, Ill., has passed into the hands of a new management. A splendid faculty, men of national reputation, has been secured. Drs. John S. Marshall, B. F. Ludwig, and E. L. Clifford, formerly with the Northwestern University Dental College, of Chicago, and Drs. B. J. Cigrand, George Leininger, and Willes Van Hook, have become interested in the American. Dr. L. Ingersoll, of Keokuk, Iowa, remains with the college. The college, under the new management, bids fair to take rank among the dental colleges of this country.

DR. G. Q. COLTON whose article, in reply to our Editorial Review on nitrous oxide gas, etc., in the January number of this journal, we publish in our Editorial Department of this issue and answer seriatim (in order to save space and time) is the man who has done more to popularize the use of nitrous oxide gas for the painless extraction of teeth than any one else. He it was who gave it to Dr. Wells for the painless extraction of the first tooth under the effects of asphyxia, produced by nitrous oxide. He claims to have administered it for the extraction of over 3,000 teeth, within three weeks and two days, shortly after this in Dr. Wells' office. He states that this success induced him to abandon his "exhibition business" and to establish the "Colton Dental Association" in New York. In a pamphlet on this subject, that the Doctor published in 1884, he says: "Whatever credit I deserve in connection with this matter, is derived from the fact that I revived the use of the gas after it had been condemned, dead and forgotten as an anæsthetic from 1848 to 1863. In this revival and demonstration of the value of the gas as an anæsthetic, is not the world *practically* indebted to me for its use. If I had not revived it, when and by whom would it have been done?" Thus it will be seen that the *strong motive* in foisting nitrous oxide gas upon the public both by Dr. Colton, Dr. Thomas and the dealers in nitrous oxide and gas appliances, is the unusual profits accruing therefrom. This motive has been so potent in the minds of these agitators that the true injurious effects have been *ignored* and the most remarkable strategy resorted to, for the purpose of popularizing and keeping before an unsuspecting public this destroyer of vitality and forerunner of insanity and consumption.

In our immediate replies to Dr. Colton's paper we have been as brief as possible, as our review of Dr. J. C. Reeve's paper published in this issue answers more fully many of Dr. Colton's arguments and to which we invite the attention of the reader.

We publish the Doctor's article verbatim, excepting two short items containing no argument, but objectionable on account of use for advertising purposes. The one was a list of endorsers given for the purpose of assisting the Doctor in his business in the use of nitrous oxide at a time when nearly everybody thought that nitrous oxide gas was an anæsthetic, and at a time when very few knew the difference between anæsthesia and asphyxia. The very same men if living to day who called in this endorsement, nitrous oxide an anæsthetic, would no doubt call it only an asphyxiating agent now.

In point of fact, we all then thought it was an anæsthetic. Our knowledge of the science, was so limited that we considered anything (that would produce a condition in which there was absence of sensation), an anæsthetic. Then it might not matter whether it were a club, electricity or nitrous oxide gas, anything that would cause a condition of absence of sensation would be an anæsthetic. But in the light of modern investigation these will not produce anæsthesia, as this is a physical condition in which the force and functions of life, are in continuance under modification.

Many valuable articles intended for this number of the journal are crowded out and must lay over for next issue. Our contributors will kindly bear with us in the delay of the publication of their articles. All articles should be sent to the Editor for publication at least two weeks before the month of publication, as the design is to have The Dental and Surgical Microcosm appear first of the month.

A very valuable, neat, little "Book of Instructions for Use of Hayes Process of Anæsthesia," is now in press, and can be had by all Licensees of said process gratis, on application to Hayes Dental and Surgical Manufacturing Company, 804 Penn avenue, Pittsburgh, Pa.

Now is the time to subscribe for The Dental and Surgical Microcosm Vol. 2. In no other journal can you get the choice articles published on the chosen themes of this Journal.

"My Experience with Batteries," is a neat little book, published by the Chloride of Silver Dry Cell Battery, of Baltimore, Md., containing much valuable information to those using or designing to use batteries.

The publishers of The Dental and Surgical Microcosm respectfully ask all who know themselves to be in arrears with their subscription to kindly remit and oblige.

VOLUME TWO.

With this number we commence our Vol. 2 of The Dental and Surgical Microcosm, assured by the very liberal support of both the medical and dental professions that we are supplying a "*long felt want*" in our literature upon the science of anæsthesia, anæsthetics and surgery in their co-operative relations. In the future, as in the past, this Journal will give no uncertain sound, will use the scalpel to uncover and expose error wherever found. Yet allowing always the right to reply, and extending her columns courteously for the same.

Any subscribers failing to get their regular numbers of The Dental and Surgical Microcosm, will please notify the Publishers and the matter will be looked up.

We respectfully ask the readers of The Dental and Surgical Microcosm to report any deaths, or injuries, caused by the administration of any anæsthetic, or so-called anæsthetic, coming under their observation, and to write, if possible, the definite cause, or relate the circumstances, that the cause may be arrived at.

THE WORLD'S COLUMBIAN DENTAL CONGRESS.

[The following is taken from the full report of the proceedings of the General Executive Committee, prepared by Dr. A. O. Hunt, Secretary.—Ed.]

Constitution—Codified Rules—Committees as Organized and Confirmed to Date.

NAME.

Article I. The World's Columbian Dental Congress.

PLACE OF MEETING.

Article II. Chicago, Illinois.

TIME OF MEETING.

Article III. Monday, August 17, 1893, continuing until August 27, 1893.

OBJECTS.

Article IV. The bringing together for professional, scientific and social purposes the dentists of the United States and all other countries.

OFFICERS.

Article V. The officers shall be a President, four Vice-Presidents, Secretary-General and two Assistant Secretaries (to be selected with reference to linguistic attainments), and a Treasurer.

MEETING OF COMMITTEE.

Article VI. The General Executive Committee shall hold its meeting for the transaction of such business at such times and places as they may elect from time to time.

DUTY OF THE COMMITTEE.

Article VII. It shall be the duty of the Chairman of this committee to preside at all meetings of the committee, and to carry out any matters put in charge by the General Committee. He shall be considered an *ex-officio* member of all committees, and as chief executive officer of the General Executive Committee. He shall have power, upon consulting with three members of the committee, to call a meeting, when in his judgment it may be necessary.

DUTY OF THE SECRETARY.

Article VIII. The duties of the Secretary of this committee shall be to keep a record of all proceedings; to receive and put in proper form, for the use of this committee, a synopsis of the work accomplished, from time to time, by each of the special committees.

DUTY OF THE TREASURER.

Article IX. It shall be the duty of the treasurer to receive and have in charge all money for or belonging to the "World's Columbian Dental Congress," and to pay out the same on the order of the Chairman and the Secretary of this committee, all bills having been passed upon by the Auditing Committee.

THE POWER OF THE COMMITTEE.

Article X. The General Committee shall have and exercise supreme control and direction in all matters pertaining to the organization and work in 1893.

QUORUM.

Article XI. Eight members will be required to constitute a quorum for business.

AMENDMENTS.

Article XII. These rules and regulations may be amended at any regular meeting of this committee, upon a vote of two-thirds of the members of the General Committee.

SPECIAL COMMITTEES.—1. A General Finance Committee, to consist of three members. 2. A Programme Committee, to consist of five members. 3. A Committee on Exhibits, to consist of three members. 4. A Committee on Transportation, to consist of three members. 5. A Committee on Reception, to consist of fifteen members. 6. A committee on Registration, to consist of seven members. 7. A Committee on Printing Transactions, to consist of three members, of which the Secretary-General shall be Chairman. 8. A Committee on Conference with State and Local Societies, with a view of eliciting their interest and co-operation. 9. A Committee on the History of Dental Legislation in this and other countries. 10. Auditing Committee, to consist of three members, of which the Chairman of the Finance Committee shall be one. 11. A Committee on Invitation, to consist of five members. 12. A Committee on Membership, to consist of five members. 13. A Committee on Educational and Literary Exhibits, to consist of five members. 14. A Committee on Clinics in Operative Dentistry and Oral Surgery, to consist of five members. 15. A Committee on Prosthetic Dentistry, to consist of five members.

16. A Local Committee of Arrangements, to consist of five members. 17. A Committee on Essays, to consist of five members. 18. A Committee on History of Dentistry in the United States, to consist of seven members. 19. A Committee on Nomenclature, to be filled at next meeting. 20. A Committee to Promote the Appointment of Dental Surgeons in the Armies and Navies of the World, to consist of fifteen members. 21. A Committee on the Care of the Teeth of the Poor, to consist of five members. 22. A Committee on Biology and Bacteriology, to consist of nine members. 23. A Committee on Prize Essays, to consist of three members. 24. An Editorial Committee, to consist of five members.

Codified Rules.—The admission fee to the World's Columbian Dental Congress shall be fixed at ten dollars. To be collected only from residents of the United States.

Duties of Committee on Invitation.—The duties of the Committee on Invitation shall be to invite such scientific persons residing in the United States and foreign countries who are not members of the profession, but who, by their recognized attainments in special departments of science, would add interest to the meeting. They shall also furnish the Committee on Membership with a list of the names and residences of those invited.

Duties of Committee on Membership.—The duties of the Committee on Membership shall be to pass upon all applications for membership which may be referred to them by the Committee on Registration or the Treasurer.

Memrership.—The membership shall consist of legally-qualified and reputable dentists (as defined in the Code of Ethics of the American and Southern Dental Association) residing in the United States, and all foreign dentists regularly qualified by the laws of the countries from which they come, and such other scientific persons as may be invited by the Committee on Invitation. Each and every member to be entitled to one copy of the transactions.

The Committee on Essays shall invite suitable persons to prepare papers for presentation to the meeting.

All papers to be read before the Congress shall be in the hands of the Committee on Printing Transactions at least six months before the date of meeting, and shall not exceed forty-five minutes in time of presentation. Said committee shall have full power to accept or reject any papers, to revise or suggest a revision by the authors, and to publish or not in the transactions the whole or parts of papers read, or abridgments thereof.

NOTE.—As the General Executive Committee did not define the duties of the several committees appointed, the Secretary deems it advisable to make the following suggestions in regard to the duties of committees not already defined, subject to the action of the Executive Committee at its next meeting:

NO. 3. COMMITTEE ON EXHIBITS.—It is expected that this committee will take charge of the different exhibits of the dealers and any other exhibits of a like character.

NO. 4. COMMITTEE ON TRANSPORTATION.—The duty of this committee will be to look after the railroad and steamship lines, and obtain the best rates possible for the members of the Congress both in this and other countries.

NO. 5. COMMITTEE ON RECEPTION.—It is expected that this committee will take charge of the comfort of all members of the Congress, and especially those members and strangers from foreign countries.

NO. 6. COMMITTEE ON REGISTRATION.—Duties of this committee will be to register all persons applying for membership in the Congress who are entitled to the same.

NO. 9, COMMITTEE ON THE HISTORY OF DENTAL LEGISLATION IN THIS AND OTHER COUNTRIES.—It is expected that this committee will collect the data relating to dental legislation in all the countries of the world from the beginning to the present time, and present a full report to the Congress.

NO. 10. AUDITING COMMITTEE.—Duties of this committee will be the auditing of all accounts and bills of the Congress preparatory for the signatures of the Chairman and Secretary of the General Executive Committee.

NO. 13. COMMITTEE ON EDUCATIONAL AND LITERARY EXHIBITS.—It is desired to have exhibits of a character that will show the results obtained by the various methods of dental education both in the past and up to the present time. Also an exhibit of the literary work of the profession to date.

NO.. 14. COMMITTEE ON CLINICS IN OPERATIVE DENTISTRY AND ORAL SURGERY.—It is expected that this committee will make every effort to secure operators to demonstrate any important or new methods of practice.

NO. 15. COMMITTEE ON PROSTHETIC DENTISTRY.—The duties of this committee will be of the same character as that of Committee No. 14, only the work will be confined to prosthetic dentistry.

No. 16. LOCAL COMMITTEE ON ARRANGEMENTS.—Duties of this committee will be to make arrangements for the accommodation of the various committees and clinics and perform other duties of a like character, and to work in connection with the World's Congress Auxiliary.

No. 18. COMMITTEE ON THE HISTORY OF DENTISTRY IN THE UNITED STATES.—The appointment of this committee seemed necessary and important from the fact that in the work of Committee No. 8 there was collected a considerable amount of matter that should properly come under the management of a committee like No. 18. So it was deemed best to appoint a new committee to work with No. 8, and take charge of the special matter of the History of Dentistry in the United States.

No. 19. Not appointed.

No. 20. COMMITTEE TO PROMOTE THE APPOINTMENT OF DENTAL SURGEONS IN THE ARMIES AND NAVIES OF THE WORLD.—It is probably well known by the profession that for a number of years efforts have been made to appoint dental surgeons in the army of the United States—so far without success; but it was deemed a matter of sufficient importance to appoint a committee to take charge of the matter, who might, by an organized effort, obtain at least the data that would have an influence upon any movement in this direction, should it be desirable to take action now or at some future time.

No. 21. COMMITTEE ON THE CURE OF THE TEETH OF THE POOR.—It is common for the members of the medical profession in large cities, or in localities where it seems desirable, to devote a certain amount of their time in the interest of charity to relieve the diseases of the poor. It seems proper and right that the members of the dental profession should also do something in this way. The Executive Committe think that efforts should be made to suggest some practical plan to secure such service for the poor.

No. 22. COMMITTEE ON BIOLOGY AND BACTERIOLOGY.—Suggestions for the work of this committee hardly seem necessary while under the direction of its Chairman, whose experience and knowledge of results that can be obtained from work of this character are beyond question.

No. 23. COMMITTEE ON PRIZE ESSAYS.—It was decided by the Executive Committee of the Congress to offer a medal for the best paper on Dental Hygiene for public distribution. This committee was appointed to take charge of this matter, and its duties will be to decide upon the merits of the papers submitted, and to whom the medal shall be given.

No. 24. EDITORIAL COMMITTEE.—The duty of this committee will be to prepare matter for public distribution and for publication in the dental journals.

The official languages of the Congress shall be English, French, Spanish, and German, and the papers shall be printed in the transactions in the language in which they are read.

After a paper has been accepted the committee shall prepare a brief synopsis to be published in the official languages of the Congress.

The Chairman of each committee shall send reports of progress to the Chairman and Secretary of the General Executive Committee at such frequent intervals as will keep them informed of all the work accomplished.

All public announcements for the General Executive Committee shall bear the signature of both the Chairman and Secretary.

All circulars issued by any committee must be sent to each member of the General Executive Committee, and they shall be of uniform size—viz., that of the minute-forms issued by the Secretary.

Resolved, That this Dental Congress offer a medal for the best popular paper on Dental Hygiene, for public distribution. To be referred to Committee No. 23, to be called a Committee on Prize Essays.

The following rules for the action of the Finance Committee were adopted:

Resolved, That the General Finance Committee be authorized to guarantee to contributors who would be eligible to membership as follows:

1. That every contributor of twenty dollars should receive the transactions of the Congress if he does not attend; and if he attends and joins the Congress, his receipt for contributions shall be accepted by the Treasurer as full payment of the membership fee of ten dollars.

2. That every contributor of thirty dollars or upwards shall have all the advantages of the contributor of twenty dollars, and,

in addition, shall receive free the commemorative medal which will be struck.

3. That every contributor of ten dollars shall receive transactions if he does not attend ; but will be expected to pay the membership fee of ten dollars in addition should he attend the Congress.

4. That any funds which may remain in the treasury after the payment of all obligations will be donated to the Dental Protective Association of the United States.

The General Finance Committee was authorized to appoint a Sub-Finance Committee for each State and Territory.

Resolved, That all matters of business presented at the general sessions of the Congress shall be referred to the General Executive Committee, and must receive the endorsement of this committee before they can be entertained by the President of the Congress. Carried.

Resolved, Whereas, the management of the World's Congress Auxiliary of the Columbian Exposition, having offered suitable accommodations in the Art Building, on the lake-front in Chicago, for the sessions of the World's Columbian Dental Congress, August 17, 1893; therefore be it

Resolved, That the Executive Committee gratefully accept the same in the spirit in which it is offered. And be it further

Resolved, That the Secretary of the committee transmit to President Bonney a copy of these resolutions as an expression of their cordial appreciation of such generosity in our behalf.

At the request of President Bonney, a committee of conference for the World's Congress Auxiliary was appointed.

Resolved, Whereas, all other convocations to be held in Chicago in 1893 in connection with the World's Columbian Auxiliary are called Congresses; therefore be it

Resolved, That the word "Meeting" be stricken out and the word "Congress" inserted in Articles 1 and 9 of the Constitution, and wherever it occurs in the proceedings to date, with the distinct understanding that the Congress shall not be considered as having connection with any preceding or future Dental Congress, but be a unique, complete, and final meeting. Unanimously adopted.

COMMITTEES AS APPOINTED AND CONFIRMED TO DATE.

General Executive Committee.

Chairman—Dr. W. W. Walker, 67 West 9th street, New York City. *Secretary*—Dr. A. O. Hunt, Iowa City, Iowa. *Treasurer*—Dr. John S. Marshall, 9 Jackson street, Chicago, Ill. Dr. W. J. Barton, Paris, Texas; Dr L. D. Carpenter, Atlanta, Ga.; Dr. J.

Y. Crawford, Nashville, Tenn.; Dr. M. W. Foster, 9 Franklin street, Baltimore, Md.; Dr. A. W. Harlan, 70 Dearborn street, Chicago, Ill.; Dr. H. J. McKellops, 2630 Washington avenue, St. Louis, Mo.; Dr. G. W. McElhaney, Columbus, Ga.; Dr. H. B. Noble, N. Y. avenue, Washington, D. C.; Dr. John C. Storey, Dallas, Texas; Dr. C. S. Stockton, Newark, N. J.; Dr. L. D. Shepard, 330 Dartmouth street, Boston, Mass.; Dr. J. Taft, Cincinnati, Ohio.

COMMITTEE OF CONFERENCE FOR WORLD'S CONGRESS AUXILIARY.

W. D. Miller, F. Busch, Berlin, Germany; Thomas W. Evans, E. Magitot, Paris, France; G. W. Sparrock, Lima, Peru; W. B. Macleod, Edinburgh, Scotland; A. W. W. Baker, Dublin, Ireland; Ernest Sjoberg, Stockholm, Sweden; Charles S. Tomes, W. H. Coffin, London, England; W. George Beers, Montreal, Canada; H. C. Edwards, Madrid, Spain; E. Lecaudy, Paris, France; J. G. Van Marter, Rome, Italy; Plattshick, Pavia, Italy; Jos. Arkovy, Buda Pesth, Hungary; C. Redard, Geneva, Switzerland; W. H. Morgan, Nashville, Tenn.; W. H. Dwinelle, New York City; R. B. Winder, Baltimore, Md.; Elisha G. Tucker, Boston, Mass.; W. W. H. Thackston, Farmville, Va.; J. B. Rich, Washington, D; C.; J. D. White, Philadelphia, Pa., W. H. Eames, St. Louis, Mo.; J. B. Patrick, Charleston, S. C.; *C. C. Knowles, San Francisco, Cal.; F. J. S. Gorgas, Baltimore, Md.; G. V. Black, Jacksonville, Ill.; *J. E. Garretson, Philadelphia, Pa.; R. Finlay Hunt, Washington, D. C.; E. Bacon, Portland, Me.; Benjamin Lord, A. L. Northrop, New York City; W. W. Allport, Chicago, Ill.; W. W. Walker, New York City; L. D. Carpenter, Atlanta, Ga.; J. Y. Crawford, Nashville, Tenn.; W. J. Barton, Paris, Texas; J. Taft, Cincinnati, O.; C. S. Stockton, Newark, N. J.; L. D. Shepard, Boston, Mass.; H. J. McKellops, St. Louis, Mo., A. O. Hunt, Iowa City, Iowa; H. B. Noble, Washington, D. C., Geo. W. McElhaney, Columbus, Ga.; J. C. Storey, Dallas, Texas; M. W. Foster, Baltimore, Md.; A. W. Harlan, J. S. Marshall, Chicago, Ill.

NO. 1—GENERAL FINANCE.

Chairman—L. D. Shepard, 330 Dartmouth street, Boston, Mass.; T. W. Brophy, 96 State street, Chicago, Ill.; A. L. Northrop, New York City.

NO. 2—PROGRAMME COMMITTEE—TO BE APPOINTED.

No. 3—Exhibits.

Chairman—Charles Pruyn, 70 Dearborn street, Chicago, Ill.; Arthur E. Matteson, 3700 Cottage Grove avenue, E. M. S. Fernandez, 103 State street, Chicago, Ill.

No. 4—Transportation.

Chairman—F. H. Gardiner, 126 State street, Chicago, Ill.; V. H. Jackson, 240 Lenox avenue, New York City; George Eubank, Birmingham, Ala.

No. 5—Reception.

Chairman—W. W. Allport, 9 Jackson street, Chicago; W. W. H. Thackston, Farmville, Va.; *G. H. Bently, 70 Dearborn street, E. M. S. Fernandez, 103 State street, George A. Christmann, Staats Zeitung Building, Chicago; James McManus, 32 Pratt street, Hartford, Conn.; Elisha G. Tucker, Boston, Mass.; John D. Thomas, 912 Walnut street, Philadelphia, Pa.; H. J. McKellops, 2630 Washington avenue, St. Louis; L. L. Dunbar, 500 Sutter street, San Francisco, Cal.; V. E. Turner, Raleigh, N. C.; Joseph Bauer, 130 Esplanade street, New Orleans, La.; J. F. P. Hudson, 19 W. 39th street, New York City; W. P. Dickinson, 608½ Nicollett avenue, Minneapolis, Minn.; C. F. W. Holbrook, 34 Park street, Newark, N. J.; W. J. Foster, 9 West Franklin street, Baltimore, Md.; R. M. Sanger, East Orange, N. J.

No. 6—Registration.

Chairman—Fred A. Levy, 343 Main street, Orange, N. J.; E. L. Clifford, 401 West Monroe street, George N. West, 34 Monroe street, Chicago, Ill.; J. Y. Crawford, Nashville, Tenn.; C. V. Rosser, Atlanta, Ga.; T. L. James, Fairfield, Iowa; W. H. Fundenberg, 958 Penn avenue, Pittsburg, Pa.

No. 7—Printing Transactions—To be Appointed.

No. 8—Conference with State and Local Societies.

Chairman—J. Taft, Cincinnati, Ohio.

[A full list of the State Committees, etc. will be given in our next issue.

DIRECTORY OF DENTAL SOCIETIES.

American Dental Association—Meets on the first Tuesday of August, 1892, at Niagara Falls. Pres., W. W. Walker, Rec. Sec., Geo. H. Cushing, Chicago.

Southern Dental Association—Meets at hotel on Lookout Mountain, Tenn., last Tuesday in July, 1892. Pres., Gordon White, Nashville; Sec'y, M. C. Marshall, Little Rock, Ark.

STATE DENTAL SOCIETIES.

Alabama Dental Association—Meets annually. Next meeting at Montgomery, on the second Tuesday of April, 1892. Pres., Geo. Eubank, Birmingham; Sec., J. H. Allen, Birmingham.

California State Dental Association—Third Tuesdsy in July, 1892. Pres., Thos. Morffew; Rec. Sec., W. A. Knowles, San Francisco; Cor. Sec., L. Van Orden. Next meeting in San Francisco.

Connecticut State Dental Society—Pres., E. A. Stebbins, Shelburne Falls; Rec. Sec., Geo. A. Maxfield, Holyoke. Annual meeting October 27th and 28th, 1892, at Hartford.

Dental Society of the State of Maryland and District of Columbia—Meets annually. Next meeting at Washington City, on the second Tuesday in October, 1892. Pres., B. F. Coy, of Baltimore; Sec., M. W. Foster, Baltimore, Md.

Georgia State Dental Society—Meets second Tuesday in July, 1892, at Rome. Pres., W. G. Browne; Rec. Sec., S. H. McKee; Cor. Sec., L. D. Carpenter, Atlanta.

Maine Dental Society—Pres., G. W. Stoddard; Sec., C. E. Bryant, Pittsfield. Meets on the third Tuesday in July, 1892. Place of meeting not decided.

Maryland State Dental Association—Meets annually in December. Pres., J. Emory Scott; Rec. Sec., W. W. Dunbracco; Cor. Sec.

Minnesota State Society—Pres., W. C. Merrill, Albert Lee; Sec., L. D. Leoard, Minneapolis. Meets in Minneapolis, July 13th, 1892.

Missouri Dental Association—Meets at Clinton, Mo., July 5th to 9th, inclusive, 1892. Pres., Geo. L. Shepard, Sedalia; Sec., Wm. Conrad, St. Louis.

New Jersey State Dental Society—Meets annually. The Union Meeting of the New Jersey and Pennsylvania State Societies will be held at Cresson Springs, Pa., July 21, 22 and 23, 1892. Pres., B. F. Luckey, Patterson; Sec., C. A. Meeker, Newark.

North Carolina State Dental Society—Meets in Morehead City, August 11, 1892. Pres., H. C. Hearing, Concord; Sec., C. A. Rominger, Reidsville.

North Dakota Dental Society—Meets July 26, 1892. Pres., S. P. Johnson, Grand Forks; Sec., S. J. Hill, Fargo.

Ohio State Dental Society—Meets annually. Next meeting at Columbus, first Tuesday of December, 1892. Pres. J. R. Callahan, Cincinnati; Sec., Otto Arnold, Columbus.

Pennsylvania State Dental Society—The Union meeting of the Pennsylvania and New Jersey Societies will be held at Cresson Springs, Pa., July 21, 22 and 23, 1892. Pres., Louis Jack, Philadelphia; Cor. Sec., H. Newton Young, Wilkesbarre.

Rhode Island Dental Association—Pres., D. F. Keefe, Providence; Sec., W. H. Carpenter, Providence. Meets quarterly, second Tuesday in July, October, January and April. Annual meeting second Tuesday in July, at Providence.

Tennessee Dental Association—Meets annually. Next meeting at Chattanooga, first Tuesday in July, 1892. Pres., Wes. DeStubblefield, of Nashville; Rec. Sec., A. G. White, Springfield; Cor. Sec., P. D. Houston, of Louisburg.

Virginia State Dental Association—Meets in Charlottsville, Tuesday, August 19, 1892. Pres., J. Hall Moore; Sec., L. M. Cowarden, Richmond.

Wisconsin State Dental Society—Meets annually. Next meeting at Milwaukee, third Tuesday in July, 1892. Pres., E. C. French, Eau Claire; Sec., C. A. Southwell, Milwaukee.

THE

Dental and Surgical Microcosm

Is a Quarterly Journal, devoted chiefly to the science of Anæsthesia and Surgery in their co-operative relations.

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THE controlling editor, DR. S. J. HAYES, who has devoted many years to the science of Anæsthesia and Anæsthetics, in their relations to surgery, will be assisted by some of the most learned in both the Medical and Dental professions in the United States and in Europe, and the JOURNAL will ever aim to be both progressive and aggressive; pre-eminently scientific and yet independent in all its literature and relations; belonging to no school of Dentists nor Physicians, but advocating advancement and a higher standing for all in their relations to science and art. In brief, it will ever aim to be worthy of its mission and a place in every Physician's and Dentist's library.

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THE
DENTAL AND SURGICAL
MICROCOSM.

VOL. 2. OCTOBER, 1892. NO. 2

[2]GENERAL ANÆSTHESIA.[1]

BY E. J. BUCK, WARREN, MASS.

To treat the above subject intelligently, it is necessary to present many points with which you are perfectly familiar; facts obtained both by experience and from authority. I may not give you much that is really new, except a few methods and experiences that I have found useful and interesting.

For the term as used to designate the peculiar state under consideration we are indebted to Dr. Oliver Wendell Holmes. Its literal meaning is a want of feeling or sensation. Exactly where to draw the line between symptoms induced by alcohol, ether, chloroform, opium, and its derivatives, cocaine and many other kindred drugs, their actions upon the system resembling each other perhaps only in the ultimate result, coma, may be considered merely technical. Allowing the significance of the term, I should certainly eliminate some that are now enumerated in the list.

Its history would be one of extreme interest had we facts instead of the vague and almost mythological references found in ancient and modern literature. So far as I am able to say, it began when Sir Humphry Davy, about the year 1800, attempted a scientific investigation of nitrous oxide and its actions upon the human system. His researches were cut short by other, and what seemed to him more important, duties. Thus, for another half-century humanity was compelled to writhe under the knife and die of maladies that are now, through the use of anæsthesia, considered amenable to surgical treatment. At that time, he made the following suggestion: "As nitrous oxide in its extreme operation appears capable of destroying physical pain, it may possibly be used to advantage during surgical operations in which no great effusion of blood takes place."

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[1] Read before the Connecticut Valley Dental Society at their annual meeting held at Greenfield, Mass., January 1, 2 and 3, 1892. [2] Read Editorial Criticisms, page 218.

In 1844, Dr. Horace Wells, of Hartford, Conn., by the merest accident, discovered, or rather observed, some of its properties; and, following up the hint, at his own suggestion submitted to a trifling operation under the influence of the gas. He was so well pleased with the result that he at once commenced to experiment upon any and all who would inhale it. In all probability he was entirely ignorant of its physiological action, or that any danger might accompany its use.

My personal experience with the agent has been as limited as I could possibly make it. One of the early theories of its action (I do not recall the author) was that of a spasmodic contraction of the pulmonary blood-vessels through the vaso-motor nerve, and was based upon the result of several post-mortem examinations, in which the right cavities of the heart were found gorged with blood, while the left auricle and ventricle were entirely empty,—a condition of the parts probably brought about by some cardiac lesion, resulting in immediate and fatal syncope.

The more recent researches of Dr. H. C. Wood lead us to very different views as to its direct actions upon these organs, while the final results remain the same. He says, "The knowledge we have of the physiological action of nitrous oxide indicates that it has no inherent anæsthetic properties, but that the loss of consciousness which follows its inhalation is the result of asphyxia, and that there is not only no proof that nitrous oxide has the power of yielding oxygen to the tissues of the body, but our present knowledge indicates that it escapes from the lungs unchanged."[1] It does not seem possible that any operator would pronounce the condition other than asphyxia, or that he would willingly inhale the gas after witnessing its action upon others.

"It has been demonstrated that animals live no longer in an atmosphere of pure nitrous oxide than they do in one of nitrogen, and that the latter will produce symptoms very nearly resembling those of nitrous oxide; that a mixture of nitrous oxide and oxygen will support life indefinitely, and finally that pure nitrous oxide is alike fatal to animal and vegetable life." [1]

Other facts brought out by the same author, and also by M. M.

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[1] Therapeutic Gazette.

Jolyet and Blanche, relate to pulse change, arterial blood-pressure, and to the chemical changes which take place in the blood itself during its inhalation. Personally, I have observed that during the first stages the pulsations were reduced in frequency, while they were increased in force, and followed later by a very rapid and feeble movement, which in their experiments were accounted for by a stimulation of the inhibitory nerves. It was found that the changes in blood-pressure were enormous and rapid. First an increase in some cases to nearly twice the normal, followed by a progressive fall to zero, and were attributed to vaso-motor stimulation, followed by vaso-motor paralysis. The last symptoms are of the gravest importance in the practical exhibition of the gas, where it is known or suspected that lesions of the circulatory apparatus or blood-vessels exist, such as fatty degeneration, aneurism, or a tendency to apoplexy.

In concluding his report, Dr. Wood says, "The changes produced by nitrous oxide and nitrogen resemble somewhat those produced by mechanical asphyxia, and what difference does exist is not sufficient to convince us that nitrous oxide and nitrogen act as direct anæsthetics, and that the whole mass of evidence is concordant in showing that it is due to shutting off the supply of oxygen from the nerve-centers, and not to the accumulation of carbonic acid." [2]

The direct analysis of the blood seems to show very uniformly a displacement of oxygen in the tissues by the gas inhaled, accompanied by a marked decrease in amount of carbonic acid. As previously stated, nitrous oxide suffers no chemical change from inhalation; and since it parts with none of its oxygen, the formation of carbonic acid must necessarily stop.

There are some very grave after-effects apparently attributable to the inhalation of nitrous oxide. Just how they are induced is not so apparent. Several observers have found large quantities of sugar in the urine of patients after the inhalation of the gas, and from good authority come cases of permanent impairment of health dating from the same, such as menstrual suppression, epilepsy, diabetes, albumen urea, and indeed pulmonary affections, with one or more cases of miscarriage. I believe the inhalation of the gas is not without possible danger in all cases, and that it should be prohibited with pregnant women, and with young girls from twelve to seventeen years old. With persons subject to any cardiac affections it should be used with the utmost precaution, if not prohibited entirely; with a patient having any renal trouble, with an habitual drunkard, or where there is an extreme nervous depression. In any case, it should only be administered by those who are perfectly familiar with its different phases, and who are able to apply prompt and intelligent measures, should occasion require. In our choice of an anæsthetic agent there is no good reason why we should select nitrous oxide in preference to sulph. ether, which we will now consider.

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[2] Ibid.

Ether was first discovered in the year 1540 by a German physician. Dr. Morton, of Boston, however, was the first to make a practical use of it as an anæsthetic. Unlike the discoveries of Dr. Wells, it was the result of a scientific comparison of alcohol and ether, as to what was known of the former and the possible action of the latter. After witnessing its effects upon his dog, he tried the drug upon himself, and probably was the first person to experience anything like its full effect.

Notwithstanding the low specific gravity of ether, its vapor is much more dense, and therefore heavier than common air. This is a fact we must not forget when necessary to operate by artificial light. We will pass its chemical and physical properties and consider its physiological action. Of this, unfortunately, we know but little. Alcohol has long been known to possess anæsthetic properties. Experimentally, it coagulates albumen by abstraction of water. The same is true with ether; but if this phenomenon has anything in common with the molecular changes in the nerve-centers during anæsthesia, it has not been sufficiently demonstrated to become a certainty.

The apparent order in which its action is exerted was first described by Flourens, in 1847. First, the cerebrum, resulting in loss of intelligence; second, the cerebellum, with loss of co-ordination of movement; third, the spinal cord, with loss of power to receive sensory impressions, and of initiating movements; fourth, the medulla, with paralysis of the respiratory and circulatory functions.

The treatment of symptoms and conditions, about which so little reliable information is at hand, or possible to obtain, is not a little difficult, and renders the subject open to the widest theories and speculation. It would seem proper, in the first instance, to efer to the phenomena of natural sleep. The refreshing influence and imperial necessity of such repose points clearly to the restorative processes going on within the body. Such a state is properly viewed as a normal condition, and yet how very nearly do some of its symptoms and outward appearances resemble what we term pathological coma. It has been demonstrated, in many ways,that during natural sleep the volume of blood in the brain is much diminished. The action of the heart and lungs is retarded, with a marked lowering of the temperature. Observe an infant. On going to sleep the scalp at the fontanels, will be found to protrude for a short time, but when the deepest slumber is reached, just the opposite condition prevails. If we disturb it in the slightest degree, more or less evidence of an increased cerebral circulation is apparent. It seems probable that the above conditions are a natural sequence of sleep, rather than that sleep is a result of the condition. Just here the analogy must stop. There are, however, many highly interesting phenomena associated with natural sleep that are not pertinent in this place, but well worth reading.

We are compelled to draw other conclusions from the study of different forms of pathological sleep. In pronounced cerebral hyperæmia the cortical portions, together with the membranes and immediate vicinity of the large arteries, are found to be variously distended. As a natural consequence, the veins will also be found to be more or less strangulated and containing large quantities of venous blood. The above morbid condition would result, first, in depriving the deeper portions of an amount of blood sufficient for their needs; and second, those portions in the immediate vicinity of the greatest congestion would soon suffer from the vitiated condition of the blood supplied.

Anæmia of the deeper tissues must, and in fact does, accompany any considerable congestion of the cortex. How this is to be explained other than by strangulation of the deeper vessels is not easy to say. Hammond enumerates, among other symptoms of cerebral hyperæmia, confusion of ideas, hallucinations, morbid apprehensions of impending evil, furious delirium, profane and obscene language. If these are not sufficiently suggestive, we may add tinnitus aurium, the peculiar flushing of the face, and occasionally perspiration. The last symptom never occurs in the earlier stages of ether anæsthesia, and would seem to be nature's attempt to restore a normal condition. A study of the graver forms of cerebral irritation reveals the same train of symptoms. To those who have observed the symptoms of apoplexy, where considerable extravasation exists, the analogy becomes very marked.

While the outward appearances and actual conditions in ether anæsthesia so closely resemble cerebral irritation, we must recognize some subtile, primordial influence upon the nerve-centers, by which those conditions are brought about. What that is, or how it is exerted, seems to me of little account, since we do not look in that direction for a failure of the vital forces, and the length of time during which a person in perfect health, would endure the toxic effect of ether would be measured by the needs of the nervous tissues for actual nourishment. Experience teaches that with ether, as with nitrous oxide, the greatest danger is from paralysis of the respiratory nerves.

It is very difficult to define the successive stages of ether anæsthesia; some authors describing two, some three, others four. Of course its action is progressive, the patient passing through a first stage, or one of exhilaration, before losing consciousness or the power to reason. I would term the latter a second, or stage of dreams, for it is now that he receives those impressions which are often the subject of confused comment immediately after waking. What has been described as a third or spasm stage, I would include with the second, the symptoms being the same except in degree, and seem to be the very last evidence of cerebral function.

Finally, we reach the third, or paralytic stage, the very first part of which is true surgical anæsthesia, and should be reached before an operation of any magnitude is attempted. There is a time, however, during the very last part of the first stage, when minor operations requiring but little time may be accomplished without pain, and in many cases without the knowledge of the patient. (The safety of this practice, however, has been questioned.)

What we may say or think concerning the preparation of the patient amounts to but little, since that must depend wholly upon the character and urgency of the case; but for obvious reasons ether should not be inhaled immediately after a full meal. It is much better to wait from six to eight hours, and about half an hour before the operation a glass of milk or coffee may be taken; not for the nourishment to be derived from it, but to dilute the constant stream of ether-laden saliva which will be swallowed during the first stages of anæsthesia, and which, acting as a local irritant upon the gastric nerves, will produce unpleasant results in most cases. If we can avoid this complication with the danger accompany it, of particles of solid food being drawn into the air-passages, we have gotten rid of one of its greatest dangers.

I see no reason for giving alcoholic stimulants except in cases of extreme nervous depression. In case of shock, it might, as a special remedy directed to that condition, be administered. In such cases, unless an immediate operation were deemed necessary, I think you would prefer to wait for a reaction. The patient's clothing must not interfere with the circulation or easy respiration, and it should be so adjusted that it can be easily removed if necessary to reach the surface of the body. When possible, the temperature of the room should be raised to 70° or 80°, as it has an important bearing upon the rapidity of evaporation, and hence completion of anæsthesia. It will also assist in maintaining the temperature of the patient, which, owing to "retardation of tissue-changes and the absence of the normal amount of oxygen admitted to the circulation,is considerably lowered, and may suddenly become dangerously low." If, after we have studied our patient's condition, we deem it safe to administer the drug, his position must next occupy our attention. In this, too, we must be governed by the nature of the operation, never forgetting the possible dangers arising from cardiac and respiratory failure, together with danger of asphyxia from mechanical causes. Whatever position is chosen, we may meet with many difficulties that will require skill and judgment to surmount. Any unnecessary noise—such as talking, whispering, or laughing in the room—should be stopped at once, and no one but the operator speak to the patient. If it becomes necessary to use force to limit his movements, let it be applied promptly, otherwise it is much better to let him take his own course.

Of the many immediate dangers attending ether anæsthesia, statistics show that asphxyia, either mechanical or from failure of respiration, is the greatest. During the first and second stages the mucous surface of the mouth and pharynx, together with the salivary glands, secrete large quantities of their respective fluids,which may find their way into the larynx, giving the patient much discomfort and often producing dangerous symptoms. "If the accumulation becomes too great, it is much safer to suspend anæsthesia until the throat is thoroughly cleared, or the patient is relieved by his own efforts." If by chance any foreign body should enter the larynx, and the patient be unable to dislodge it by the violent coughing it produces, we have a very unfortunate condition, the sequel of which will depend upon the operator's skill and courage.

In the third stage the tongue, becoming paralyzed, may fall back upon the epiglottis, thus interfering with the act of respiration. For the relief of this condition various methods may be practised, but that suggested by Dr. Howard will give the best results. The main features of this method are as follows:

"Place the patient upon his back" (preferably upon the floor), "elevating the thorax by placing a roll of blankets beneath the scapulæ. In this position the chin will present to the ceiling instead of the face, so changing the line of gravitation that the tongue will fall from the pharynx and rest upon the hard palate. The entire posterior wall of the pharynx will be shifted backward, at the same time the larynx will be pulled downward and forward by the sterno-hyoid muscles; while the lower jaw, being lifted upward and forward, will cause a tension of the mylo- and genio-hyoid muscles, thus lifting the hyoid bone, and through the hyo-epiglottic ligament cause the epiglottis to share the same movement."[1] A few inhalations of air will restore the functions of the parts.

If we have escaped the preceding complications, our patient may suddenly and without warning stop breathing entirely from paralysis of the respiratory centers. The face becomes livid with rapidly increasing signs of asphyxia, the muscular system is completely relaxed, the pulse being reduced in frequency and force. The absence of muscular rigidity will differentiate this condition from one of simple spasm, in which respiration is voluntarily resumed in a few seconds.

No time should be lost in meeting this difficulty, either with the battery or artificial respiration, by one of the different methods. The position of Howard will favor whichever method is employed.

"One of the characteristic effects of ether, is that in its progressive action upon the vital functions the respiratory centers become depressed more rapidly than the circulatory, the heart continuing to beat for some time after respiration has ceased." The greatest danger, as before stated, is to be found in this direction. Both the pulse and respiration should be closely watched, and any failure of the former will be found to have been preceded by an unmistakable depression of the latter. While cardiac syncope is very liable to occur in chloroform narcosis, happily it is very rare with ether.

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[1] "American System of Dentistry."

Should we be so unfortunate as to be overtaken with an accident of this kind, I know of no reliable symptom that will warn us of its approach. It is certain that well-defined indications of cerebral anæmia will announce its presence, if not discovered sooner, and to this symptom our efforts should be directed by placing the patient in such a condition that by gravitation a fresh supply of blood will reach the brain. We should make all possible endeavor to re-establish respiration, and, by well-directed manipulation over the cervical veins, assist the return flow of venous blood. Experiments with amyl nitrate, have demonstrated its value as a remedy in cases of cerebral anæmia. This is supposed to be derived from its power to control many spasmodic affections, and by relaxing the muscular coats of the cerebral vessels it assists in restoring circulation. Given in doses of two to four minims, it is said to raise the temperature of the body.

There are, perhaps, but few conditions in which ether anæsthesia would be entirely inadmissible. Those would include some of the more serious cardiac troubles, especially if the patient is very old. When the action of the lungs is considerably limited, or where there is an excessive secretion from irritated surfaces along the respiratory tract, we must be very cautious. Drunkards, opium-eaters, or persons who are known to faint from slight causes, as well as cases of advanced pregnancy, must be treated always as dangerous.

The after-effects of ether anæsthesia, so far as it is known, are very few. More or less pulmonary congestion must always follow, causing with some patients a slight cough, which may last from one to two days. The patient must be cautioned against undue exposure, otherwise, if the conditions be right, pneumonia may result. The severe headache produced by cerebral congestion, may be relieved by appropriate treatment, and, unless the patient be advanced in years or has a tendency to apoplexy, is not a grave symptom. The ever-present nausea, a sympathetic manifestation of the preceding condition, is one of the most distressing and objectionable features of ether narcosis. If the patient remains supine and is allowed to sleep off the drug, it will generally disappear as the normal circulation is resumed. Chloroform given internally in doses of two to four minims will relieve and often control the most persistent vomiting. I have used, also, pure creosote in one-minim doses, both of which act as a local anæsthetic upon the gastric nerves, thus tiding over the difficulty until other conditions prevail.

Finally, the patient should be closely watched until he has completely recovered, for even now the vital forces may suddenly fail.

Much can be said of chloroform, but after we had finished we should be compelled to add, don't use it. The sphygmographic tracing of a patient under its influence says, in unmistakable terms, do not use it. It is said to have been discovered by a Dr. Guthrie, formerly of Brimfield, Massachusetts, in 1831, and independently in 1832 by Liebig. It seems to unite with both alcohol and ether, but when such a combination is evaporated from a sponge we have no evidence that they remain combined in the form of vapor. On the contrary, the vapor is at first strongly impregnated with the odor of ether, and later on we lose nearly all trace of it. We should expect this result, since its specific gravity is nearly twice that of ether. If we derive any benefit by such a combination, it must be from the fact that alcohol retards the evaporation of the chloroform and insures a greater admixture of air. There must come a time, however, when the patient, already partly anæsthetized with ether, is inhaling nearly pure chloroform, and at a time when he is in no condition to endure its depressing influence. When taken alone, or in combination, its action is more rapid and less under our control than ether. Its powerful action upon the vaso-motor nerve-centres reduces the arterial blood-pressure to an alarming extent, and just here we may look, perhaps, for some clue by which we may trace back to a cause some of the sudden and mysterious deaths which investigation and post-mortems have given us no hint of the truth. If we will remember the relative position of the pneumo-gastric and vaso-motor centres, and also their many reflex connections with other centres, we can readily see why any injury to one is at once reflected to others.[1] The blood contained in the veins is useless for the nutrition of the tissues. It is supplied and retained in the arteries, first, by fresh blood being pumped into them from the venous sytem; and secondly, by the contraction of the capillaries, which prevents it from passing too rapidly again to the veins. Any shock or injury, such as extraction of a tooth, will be reflected to both centers; and if the heart's action is thereby diminished or stopped temporarily, the same irritation will cause a contraction of the arterioles, thus retaining the blood and furnishing nourishment to the tissues until the action of the heart is resumed. In complete anæsthesia the reflex action of both nerves is abolished; but in partial anæsthesia the vaso-motor centre may become insensible before the vagus, and any sufficient injury might stop the supply, while that in the arteries flows on to the venous side,'' where we find it always in case of shock and in the cadaver.

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[1] "American System of Dentistry."

I wish to add, in relation to ether narcosis, I have observed that if inhaled in the early morning, while the stomach and its dependent nerves are in a state of perfect rest, we shall have less nausea; also if we use Squibb's ether and conduct our manipulations so as to reach perfect anæsthesia in the shortest possible time, the same good results will obtain. Just here you may say is a difficulty,—that of strangling our patient. But let us impress upon his mind and teach him the importance of breathing fully and deeply through his nose before we commence. One who has not tried it has no idea how kindly the nares and upper pharynx will take to its fumes, and of the agreeable sensation, when compared to that of inhaling by the mouth.

I have already taken too much of your time, but I have met with several cases in my practice, in which I took a very vivid interest, and after what I have written it might not be improper to give a brief account of the same.

Case I.—Male; age, thirty-five to forty. Temperament, nervous; habits, intemperate. Was treated for neuralgia in a palliative way, with morphia and chloral, for four months. At last his physician sent him to me to discover a cause, which was located in a closed, chronic alveolar abscess. After inhaling nitrous oxide a very short time, he suddenly showed marked symptoms of asphyxia; voluntary respiration ceased almost immediately, with pulse barely perceptible. Since the object was to remove the tooth, I did so, hoping to derive a benefit from the shock and accomplish the object also. (After deliberate thought, however, I cannot condemn my course in this respect too severely.) Applied Howard's method and succeeded, after a time, in restoring normal respiration.

Case II.—Male; age, twenty-five. Has no peculiarities. Temperament, phlegmonous. Ether was the anæsthetic, and result asphyxia, by the tongue falling upon the epiglottis. In this case much time was lost in trying to draw the tongue forward, which failed, owing to the tetanic contraction of the facial muscles, until all voluntary respiration had ceased. I at last placed him upon his back, raising the thorax about six inches, allowing the head to rest upon the floor. In this case I used direct insufflation.

CASE III.—Female; age, thirty-five. Temperament bilious, rather anæmic; had recently suffered both mentally and physically until the nervous system was somewhat reduced. Ether was administered very cautiously. A condition of asphyxia followed, with entire loss of respiration. Heart's action very weak. Treatment same as Case II.

In studying these cases, we discover two distinct conditions: Cases I and III, respiratory failure; Case II, asphyxia from mechanical cause. I cannot say that the last medicine cured my patients or saved their lives, but I certainly know that their condition was very serious.

MICRO-ORGANISMS OF THE MOUTH.

BY JO. H. LINSLEY, M. D.,

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Read before the Vermont State Dental Society, March, 1892.

I have many times had the misfortune to be obliged to seek the aid of members of your profession, and the treatment I have sometimes been subjected to by them, while very generally resulting in my benefit, was of a very intense and extractive nature.

I never anticipated being especially called upon to attempt an elucidation of any subject having a direct bearing on the details and operative work, incident to the practice of your profession, and even an intelligent discourse on the theme of which I speak to-day, would, but a very few short years ago, have been practically impossible and excited but little interest.

But when a representative of your society, four or five weeks ago, solictited of me a paper on "Bacteria of the Mouth," to be presented at the present session of your association, I consented to his proposition with pleasure, more especially as I had intended, shortly, to undertake some bacteriological investigations in this direction. I very much regret the limited amount of time I have had, in which to properly conduct many practical researches of some of the surprisingly numerous varieties of micro-organisms which either find their habitat in the oral cavity, or are simply resting strangers, or *loungers*, as I might say, in this locality. While I shall exhibit to you some flourishing so-called "pure cultures" of bacteria, whose ancestors were removed from carious teeth, inflamed gums, and improperly cleansed "grinders," I have, necessarily, been obliged to resort to the latest text-book on the subject, and to the various papers and articles which have recently appeared in medical and dental periodicals, both domestic and foreign, for the recognized varieties of germs infesting the mouth, their relatively respective frequency, etc.

To accomplish more than this, under the circumstances, was impossible, and the procuring of even the scanty material, which I shall present to you, exacted much more time and labor, than you might at first imagine.

It is an interesting fact in the history of bacteriology, that the first authenticated record and drawings of bacteria, were made from micro-organisms discovered in mucus from the human mouth by Leeuwenhoek in 1683. From this time, until about 1860, but little progress was made in this subject, and the rapid strides, and the accumulation of important data accomplished in recent years, has been very largely due to the improvement and perfecting of optical instruments. The fortunate discovery, by Koch, and the use of artificial, solid, transparent food-media, was of scarcely secondary importance in the development of bacteriology,* by facilitating the separation, culture, and examination of germs.

A brief description of the more common culture media used for separating and growing organisms of the mouth, together with the methods employed in obtaining pure cultures, will be of interest to those of you who are unfamiliar with the details of bacteriological investigations.

Nutrient Gelatine.—This is composed of beef-juice or beef extract, to which is added from 5 per cent. to 20 per cent. of best French gelatine, 1-10 per cent. dried peptone, and 1-20 per cent. common salt. The reaction must be neutral, or very slightly alkaline. The addition of 1 per cent. to 2 per cent. of sugar improves the medium for the growth of mouth-bacteria.

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*"Micro-organisms of Human Mouth."—Miller.

This material is easily prepared,† and is largely employed, especially for plate or dish cultures. It is unfit for use in the incubator, as the gelatine is liquified at temperatures above 25° C. The characteristic growth of many bacteria is better exhibited on this substance than on the following.

Nutrient Agar-agar.—This is prepared‡ similarly to the foregoing, only that 1 per cent. to 2 per cent. agar-agar is used, instead of the 5 per cent. to 20 per cent. of gelatine. (For detailed directions for the preparation of these media, reference to the text-books on Bacteriology is advised.)

Boiled Potato.—This is a very simple and valuable nutrient medium. Any sound potato can be used, excepting those which crack open, or become mealy, on boiling. The potato is carefully washed and scrubbed with a stiff brush (an ordinary nail-brush answers very well), and the "eyes," and any unsound portions, removed; it is then soaked for one hour in a 1:1000 bichloride of mercury solution, and finally boiled in a steam sterilizer, or cooking "steamer," for one-half or three-quarters of an hour. It is then placed in a moist chamber, or covered glass dish, which has been sterilized, and in the bottom of which has been placed a piece of filter, or blotting paper, slightly moistened with a 1:2000 bichloride solution.

If the proper precautions have been observed in their preparation, potatoes thus treated will remain germ free indefinitely, and can be used at any time at a moment's notice, for the planting of material from which cultures are desired. Many bacteria exhibit their most characteristic growth on this medium, and but few germs are known which refuse to exist on it.

Occasionally a micro-organism is met with which requires for its full development a different soil from any of the three media just enumerated. In such cases other substances are used, such as sterilized blood-serum, starch-paste, boiled hen's egg, etc.

Liquid media are also employed in the cultivation of micro-organisms generally, as well as those from the mouth, but more especially for studying the progress and phenomena of putrefaction, fermentation, decomposition, etc., occasioned by the action of bacteria. Such media are bread-juice, peptonized beef-bouillon (to which has been added 2 per cent. sugar, with, occasionally, the addition of starch,) urine, milk, watery extracts of various plants or grains, juice of fruits, saliva (to which some nutritious substance has been added), etc.

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†It can be obtained already prepared by Eimer & Amend, 205, etc., Third Ave., N. Y.

‡This can also be bought of the same firm.

Pure cultures are obtained by transferring a minute quantity of a "colony" from a glass plate, or Petri dish, on the end of a sterilized platinum needle, to a tube of nutrient medium, where it is "planted" by either thrusting the needle directly through the centre of the solidified culture medium in a test-tube, then twisting the needle a few times between the thumb and fingers, and carefully withdrawing same, (the so-called "thrust," "puncture," or "stab" culture), or by drawing the point of the impregnated platinum needle, which has been slightly bent, across the *surface* of the medium, which has been allowed to solidify in the tubes, in an oblique direction (the so-called "scratch," or "surface" culture.)

Considerable work and investigation in this line can be done by the practicing dentist, or physician, without investing in an expensive outfit; *at least* it is quite practical for any practitioner, who desires to determine the existence of any particular species of micro-organisms in certain cases, to *himself* inoculate a prepared tube of gelatine, or agar, with the suspected material, and send the same immediately to a bacteriologist for further treatment, examination, etc. The following is a procedure I have employed in the investigations of this subject, and is, as you will admit, exceedingly simple and quite satisfactory. I use the glass phials of various sizes, used by some wholesale drug houses for holding physicians' samples of pills, parvules, tablets, etc. These phials are sterilized, filled with from 1 to 2 ctm. sterilized gelatine, or agar, and their mouths closed with the ordinary cotton-wool plug. When a patient comes under treatment, having a lesion of the mouth, teeth, or gums, the bacteria of which it is desired to cultivate, the dentist sterilizes an excavator, by passing it back and forth through the flame of his spirit lamp, or Bunsen burner, a few times, and carefully removes a bit of material from the mouth and pushes it just into the gelatine in the prepared bottle. The same day, at the first opportunity, this is sent to me, and dish-cultures, etc., are subsequently made from the specimens.

To review *all* the varieties of bacteria which have thus far been described and obtained (over 100 species) from the buccal cavity, with their individual peculiarities, etc., would require several papers, each fully as long as the present one. I shall, therefore, confine myself to the consideration of a few of the more prominent and frequently occurring varieties, and afterward offer some comments, applicable, in a *general* way, to the subject.

It has been customary for many observers, to classify every thread-producing germ, which they find in the buccal cavity, as "leptothrix buccalis." This is to be deprecated, as there are several bacteria of the mouth which form threads.

The name "leptothrix buccalis" (like "bacterium terms"), designates no particular organism, possessing peculiar characteristics, and the name no more deserves to be retained than "denticola," "Buhlmann's fibres," etc.; the less so since it has always been the expression for an obscure and erroneous conception. Morphologically, as well as physiologically considered, leptothrix buccalis has been regarded as a veritable wonder. It has been said to perforate and split up teeth, its elements to cause all kinds of diseases in the oral cavity, to penetrate into the lungs, the stomach, and other parts of the body, and everywhere to manifest a destructive influence.

As absolutely nothing was known concerning the biology and pathogenesis of this organism, all sorts of wonderful properties were ascribed to it. It is therefore high time to banish this confusing name from bacteriological writings. (Miller.)

Miller suggests the name of leptothrix innominata for those germs of thread-like growth, whose biology is too ill understood, to place their relation to other mouth-bacteria.

Let us, for a moment, consider what the inducements are which the mouth, as a whole, offers to wandering, homeless "bugs," that they so readily and promptly enter these premises, and not only obtain their own individual livelihood, but, unceremoniously, at once proceed to increase the members of their households.

As pertinently stated by one observer,* the mouth forms "a kind of hot-house, or forcing ground, for their cultivation." Dr. Bergtold† says: "If one could find a perfectly sterile mouth, he could also see at once that the opportunies of seeding it, so to speak, are excellent, in that every invidual is more or less constantly taking in air and also food and drink through that channel, and in both these actions receiving numberless spores and other forms which, later, give us growth of bacteria.

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*Woodhead—"Bacteria and Their Products," p. 337.

†"The Mouth as a Center of Infection," W. H. Bergtold, M. D., Dental Cosmos, Vol. 43, No. 2.

The organic and inorganic substances found in the mouth, which may serve as nutriment for micro-organisms, are the following:*

1. Normal saliva;
2. Buccal mucus;
3. Dead epithelium;
4. Dental tissue softened by acids;
5. Exposed pulps;
6. Exudations of the gums, conditioned by the irritation of tartar, etc.;
7. Accumulation of particles of food.

The carbohydrates and albuminous substances furnish the greatest nutriment for bacteria in the mouth, and are almost constantly present there at all times. They are found between the teeth, in cavities in the teeth, and also upon their surface, and in any depressions.

Perfectly pure, mixed, human saliva has no toxic properties, and in those cases which have been reported by Pasteur, Valpian, Gautier and others, in which "unadulterated human saliva caused more or lesss morbid phenomena," it must be suspected that the samples used *were*, in some manner, contaminated.

Mixed with the various deposits of bacteria, etc., always present in the mouth, saliva may possess most energetic toxic properties, having many times proved fatal, even as abundantly proved by numerous recorded cases.

It is also probable that the saliva has far less antiseptic properties than is often ascribed to it, and the undisturbed growth of micro-organisms in the oral cavity, would seem to sufficiently support this view.

The diastatic action of the ptyalin of the saliva, in changing starch into a variety of sugar, variously termed dextrose, maltose, or ptyalose, which, as soon as formed produces an excellent culture-medium for those germs concerned in the process of fermentation.

According to Miller,† there are six different micro-organisms which are almost invariably present in every mouth. They are:

1. *Leptothrix innominata.* This occurs as thin, more or less zig-zag threads. Found in the soft white deposit on teeth in *every* mouth. Is stained faint yellow by a solution of iodine in iodide

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*"Micro-organism of the Human Mouth," Miller, p. 37.

†"Micro-organisms of the Human Mouth," Miller, p. 69.

of potassium sol., slightly acidulated with lactic acid.

2. *Bacillus buccalis maximus.* Occurs as isolated bacilli, or threads, more often as "tufts of threads." Is the largest of mouth bacteria. Is stained brownish-blue more or less deeply, with iodine solution.

3. *Leptothrix buccalis maxima.* This occurs as long, thick, straight or curved filaments, somewhat similar to bacillus buccalis maximus. Is found on the mucus deposit upon the teeth. Is not stained by the iodine solution.

4. *Jodococcus vaginatus.* Occurs singly or in chains of from four to ten cells. Chains have a sheath, and cells appear as flat disks, or as more rounded, even squares. Occurs in all unclean mouths. Not stained with the iodine sol.

5. *Spirillum sputigenum.* This is seen as rods, curved like commas, having very active, spiral movements. Found in all mouths, especially in unclean ones. Is the soft deposit on the margin of inflamed gums of dirty mouths. Stains more readily than the foregoing.

6. *Spirochaete dentium* (denticola). Found as spirals of very irregular windings and unequal thickness. It is found under the margins of the gums, when covered with a dirty deposit and slightly inflamed, or in other words, gingivitis marginalis.

There are a great many mouth bacteria proper, not *invariably* found in *every* mouth, which are uncultivable and whose pathogenesis is unknown. Among them Miller found a bacterium of enormous dimensions, in the mouth of a dog suffering from pyorrhœa alveolaris, which he has called leptothrix gigantea. There are also three or four kinds of germs from the mouth which give a blue, or violet reaction with iodine, and from twenty to forty varieties which are cultivable, partly non-pathogenic, partly of unknown pathogenesis. The oral cavity is a favorite locality for many varieties of chromo-genic or color-producing bacteria. These are widely diffused in nature, and occur abundantly in water, in the air, and various places.

In the mouth they are less numerous than the colorless germs, and probably on account of this preponderance, the color is not visible when in this locality, but is readily developed during the culture of these micro-organisms on many of our culture media.

Among the colors produced by different species of the mouth bacteria, Miller, gives a yellow, produced by at least eight kinds of bacteria: *green* (by 5), *red*, or reddish (by 3), *blue*, *black*, *brown*, *orange*, etc.

To study any of the bacteria, particles of matter containing them must be taken from the mouth, and mounted directly on covered-glass, after which they may be examined fresh and unstained, or (after being carried through the flame of a Bunsen burner or spirit lamp *three times*) be stained and mounted permanently.

Many of the germs that have been found in the oral cavity are, of course, accidentally present, having been deposited just previous to an examination, which would only remain a short period.

The micro-organisms I have just mentioned, as being termed "Mouth Bacteria Froper" by Miller, are found in *all healthy* conditions of this cavity, but the variety and number is more or less greatly augmented when any morbid condition whatever occurs, such as inflamed gums, wounds, etc., of the mucous membrane of the mouth, dental caries and ulcerations, etc. Of these Miller found, by inoculation experiments on mice, rabbits and guinea pigs, many germs, the inoculation with which produced either death, or a pathological condition of the animals thus treated. These he calls "*Pathogenic Mouth Bacteria*." Of the varieties separated, the following were studied more in detail:

1. Microccus gingivæ pyogenes;
2. Bacterium gingivæ pyogenes;
3. Bacillus dentalis viridans;
4. Bacillus pulpæ pyogenes.

The first of these micro-organisms, *mic. ging- pyog.*, was found several times in a case of pyorrhœa alveolaris, in the deposit around the teeth of a very filthy mouth.

The second, *bact. ging. pyog.* was found in the same mouth as the foregoing, and also in a suppurating tooth-pulp of a second person.

Bact. dent. virid., the third variety, was found in the superficial layers of carious dentine. In cultivation upon gelatine this bacterium produces a beautiful opalescent green coloring matter which it imparts to the gelatine.

The fourth bacterium, *bact. pulp. pyog.*, was found in gangrenous tooth-pulp. The inoculating materials used, were pure cultures of the different germs, mixed cultures and gangrenous pulps, and the inoculations were made into pockets beneath the skin of the animals and by subcutaneous injections, and injections into the abdominal and thoracic cavities. The pockets were made as usual, at the root of the tail, and the injections with sterilized syringes.

Before giving the results of these inoculations, let us see what are the conditions necessary to be fulfilled, in order to establish unrefutable proof of the pathogenic nature of any given bacterium. According to Koch, a micro-organism must comply with the following requisitions, before its pathogenic character is determined, the so-called "*Koch's laws*, or "*rules:*"

First—It must be proved to be present in all cases of the disease in question.

Second—It must further be present in this disease and in no other, since otherwise it could not produce a specific definite action.

Third—A specific micro-organism must occur in such quantities, and be so distributed within the tissues that all the symptoms of the disease may be clearly attributable to it.

Fourth—After removal from the body of an affected animal, and its growth in pure culture, the inoculation of the latter into susceptible animals, must produce the disease in question.

Miller's inoculations were followed by either local redness and swelling, abscesses, suppuration and gangrene of adjacent tissues, or blood poisoning, and in many cases by death from septicæmia peritonitis, pleuritis, etc.

Inoculations with mixed cultures proved more dangerous than when pure cultures were used, and still more effective when gangrenous pulps were used than with mixed cultures.

The diseases caused by the pathogenic bacteria of the mouth Miller considers under six heads, according to the point of entrance of the infection:

1. Infections caused by a breach in the continuity of the mucous membrane, brought about by mechanical injuries, (wounds, extractions, etc.). These lead, either to local or to general disturbances.

2. Infections through the medium of gangrenous tooth-pulps. These usually lead to the formation of abscesses at the point of infection (abscessus apicalis), but also sometimes to secondary septicæmia and pyæmia with fatal termination.

3. Disturbances conditioned by the resorption of poisonous waste products, formed by bacteria.

4. Pulmonary diseases caused by the inspiration of particles of slime, small pieces of tartar, etc., containing bacteria.

5. Excessive fermentative processes, and other complaints of the digestive tract, caused by the continual swallowing of microbes and their poisonous products.

6. Infections of the intact soft tissues of the oral and pharyngeal cavities, whose power of resistance has been impaired by debilitating diseases, mechanical irritations, etc.

7. Possible infections by the accumulations of the excitants of diphtheria, typhus, syphilis, tuberculosis, etc.

DENTAL CARIES.

It has been proven, beyond doubt, that decay of the teeth is caused by two different processes, namely: (a) chemical, (b) parasitical.

The first is a decalcification of the enamel, or dentine, or both, caused by the presence of acids in the mouth, which have been formed from the fermentation of starch and saccharine substances, resulting in a softening of these tissues, after which these latter form an excellent food-medium for many varieties of bacteria.

The prevention of dental caries depends, first of all, on strict cleanliness of the mouth, the importance of which can not possibly be over-estimated, the details necessary for the proper fulfillment of the same would be superfluous for me to suggest to you. Undoubtedly, good stiff tooth brushes and plenty of clean water stand at the head of all measures of this nature. The next prophylactic means is the intelligent use of proper antiseptics.

By far the most perfect germicide known, that can be at all employed in this connection, is the bichloride of mercury, but the use of this substance is not without danger. It should not be used as a wash for the mouth in solutions of greater strength than 1 to 2000, and even then care must be exercised in its application. Other antiseptics which have been recommended for the oral cavity are salicylic acid, strength of 1:200, or 1:350 listerine, wintergreen oil, and like aromatic substances are suggested.

In this connection might be noted the germicidal properties of tobacco, either the juice of the leaf or the smoke of the burning leaves. Certain it is, from results obtained by many experiments and observations, that tobacco-juice, or smoke, very speedily destroys bacterial life, but I would not, on this account, advocate its use, as the evil results of excessive indulgence in the ''weed'' more than counterbalance any possible benefits resulting from its antiseptic action on micro-organisms of the mouth.

In discussing the subject of infection, attention should be directed to the danger which exists from the spread of infectious forms of bacteria that are liable to be present in the mouth in various directions. It is not difficult, under certain circumstances, to excite an inflammatory process in the middle ear, the transmission of septic germs taking place through the eustachian tubes; similar results may also occur from pyogenic bacteria being carried from the mouth to the throat, lungs, parotid gland, antrum, and even to the brain, as stated by Bergtold.

When it is considered that of all diseases of a parasitic nature to which mankind is susceptible, dental caries is by far the most frequent, the possibilities, I have just mentioned, can not be charged as being the improbable and unlikely speculation set forth by one who is ''cranky'' on the subject.

Upon reviewing the various literature on this question, especially those portions of it which refer to the dangers of infection between the dentist and his patient, the speaker was much surprised to find no advice offered to the dental profession by competent bacteriologists, as to the considerable (and oft-times *great*) danger present, to the patient, by pathological conditions the dentist *himself* may be suffering from at the time of operating, and to point out the necessity of establishing, by legislative measures if required, laws, or statutes, which would prevent the occurrence of such dangers.

I refer more particularly to the jeopardy in which human life is placed, when people are subjected to treatment by a practicing, *tubercular* dentist. This may seem, to many of you, as a bit of superfluous advice, and you may retort that such a circumstance is beyond the bounds of possibility, but I assure you, *I have seen a tubercular member of your profession practicing daily on unsuspecting, or ignorant, and innocent patients.*

My experience with dentists has been very limited, and therefore, I am not in a position to make any assertions as to the frequency of such pernicious and dangerous proceedings; but the very fact that my slight personal observations resulted in the detection of *one* such case naturally suggests a possible more common occurrence of tuberculosis in practicing dentists than might be supposed. Since commencing the work incident to the preparation of this paper, one of the local members of your profession has detailed another case, which was under his own personal observation, of a "TUBERCULAR PRACTICING DENTIST."

The *greatest* danger, under such circumstances, *is not*, as some of you might imagine, in the infection of the patient by the transmission of the germs through the medium of the breath of the operator, but in the reception of tubercular material, which becomes dry on the handkerchief, clothing, linen, or instruments of the dentist. The prevention of such desiccation is so extremely difficult and impracticable as to be discarded without serious consideration, if such (prevention) be presented as a possible prophylactic measure, to enable the victim of this malady to continue his professional work until physically unable to do so on account of the inroads of the disease.

It is not generally known that bacteria do not float in the atmosphere in the moist state, but only do so after desiccation, and then probably to no great extent, unless aided by more or less strong currents of air.

Tuberculosis is now almost universally considered to be an infectious disease, and of so contagious a nature that I candidly believe, we shall, many of us, see the day when attention to preventive measures against possible infection from cases of this disease is as regularly insisted upon as are the sanitary requirements in cases of small-pox, yellow fever and typhus fever (with the exception of somewhat less vigorous quarantining) at the present day. The period in which to accomplish this much desired treatment of tubercular cases will depend upon the rapidity with which the laity, and *professional men* even, become educated to the full comprehension of the single and *sole* cause of the affection, the tubercle bacillus, and the proper realization of the benefits to be derived from the adoption of such measures. And to the intelligent efforts and advice of the members of the medical profession, as well as to the great aid which *you*, members of the dental profession can give by embracing each and every opportunity to inform your patients, especially influential citizens, as to the true character of tuberculosis, must the accomplishment of this end very largely devolve.

Of all the various ways by which tubercle bacilli find entrance into the human body (such as from the surface of the skin through wounds, by contusions, cuts, or otherwise; from the ingestion of milk and flesh from tubercular cows and animals, etc.), infection by inspiration—by the entrance of the dried germs through the mouth, and so on to the lungs—far surpasses in frequency all other methods of transmission. And this can only be accomplished when the medium on which the micro-organisms have been discharged from the body dries, or disintegrates into powder or dust. For this reason the most dangerous source of infection is from handkerchiefs, or cloths on which the sputum has been received (unfortunately a too common procedure) and on which it becomes dry in an exceedingly short time. Consequently by merely preventing the sputum of phthisical persons from drying the most important kind of infectious matter may be rendered harmless.

The first contradiction I have seen by competent pathologists (who acknowledge the tubercle bacillus as the essential cause of tuberculosis) to the statement that the *commonest* source of infection is the inhalation of dried bacilli from handkerchiefs, linen, clothing, dust from the floors and ceilings of rooms previously occupied by tubercular subjects, etc., was recently made by Dr. J. West Roosevelt, of New York.*

Dr. Roosevelt maintained "that there was much more likelihood of getting an over-dose of the virulent germs" (of tuberculosis) "through the alimentary tract, either by the ingestion of meat, milk, or in children, by putting articles of every nature into their mouths, no matter where they may have lain," than by the manner which I have just described. While recognizing the value of the opinion of so able an authority as Dr. Roosevelt I am convinced that his statement will not be corroborated by the majority of pathologists and bacteriologists in this country, or on the continent. True it is that much needless alarm may be created in the minds of the public by the advocacy of too severe and unnecessary measures of prevention, such as quarantining, etc., by prejudiced and over-zealous investigators, the effect of which would be the unjustifiable persecution of many poor victims of tuberculosis, and as I just suggested, the *only proper* course to pursue in dealing with this question is by persistently and intelligently educating the minds of the public as to the *exact* status of this matter.

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*New York Academy of Medicine, Feb. 4, 1892; vide Medical Record, Vol. 41, No. 10.

Few pathologists at the present day believe in the theory of heredity as a cause of tuberculosis. But it is a fact that the offspring of consumptive parents, especially where the mother is affected, often develop sooner or later the disease, but the explanation is to be sought in a general impoverished condition of the organism, as indicated by enfeebled assimilative and nutrient powers, which are quite sure to follow as the inheritance from unhealthy progenitors.

What I have just said in regard to transmission naturally leads to the most interesting and important problem in bacteriology, namely, that of *immunity*; and I ask your indulgence for a few moments in order to state the theories at this time held in regard to this subject.

As you are probably all aware two principal views are advanced to account for the difference of susceptibility possessed by different animals to the same micro-organism, and also that exhibited by the *same* animal to *different* germs.

I might state here that immunity is of two principal kinds, to-wit: (a) *natural*, or "in-born;" (b) *acquired*, or "artficial."

The first of the theories of *natural* immunity is based on the *chemical* germicide properties of the blood-serum and tissue-juices of the body.

The second, or "*Metschnikoff's*" theory attributes the resisting power which an individual or animal may possess to the so-called "*phagocytic*" action of the tissue-cells of the body, more especially the colorless corpuscles, or leucocytes of the blood.

Metschnikoff believes the presence or absence of immunity depends on the ability or inability of the cells of the body to devour and destroy the bacteria. Such ability may be natural or acquired. In the latter case the cells, where they have once had the opportunity of devouring attenuated micro-organisms with a milder poison, which nature enables them to withstand, are so far accustomed to it that they can devour the most virulent material with impunity. This can be effected both by gradual adaptation, and also by a kind of selection in which only the strongest, most vigorous cells remain and transmit the acquired faculty to their descendants. The leucocytes are but short-lived cells. A permanent resistance of the organism to a disease which it has once had, or against which it has been protected by inoculation is, therefore, only conceivable if we grant to the cells the power of transmitting an acquired property unaltered to their children and their children's children. This hypothesis, as must have been seen, presupposes an extraordinary docility in the protoplasm of the white blood-corpuscles, to which it attributes something like feeling, thinking and acting, a sort of mental perception. But if we raise no objection to this, there remain plenty of reasons for combatting the phagocytic theory as immunity.

In our opinion, the fact that it is essentially the excretions of the bacteria which produce, or are able to produce immunity, is difficult to harmonize with Metschnikoff's hypothesis, for if no living micro-organisms are present none can be devoured to accustom the cells to the poison and prepare the way for resisting more virulent successors. To overcome this difficulty it would be necessary to suppose that the reception of attenuated germs acts upon the cells only as a specific stimulant, to which they answer by a functional reaction, and that this stimulating power exists in the same degree, and works in the same manner, also, in the bacterial products. The theory of the germicidal action of the blood-serum, or plasma is, I believe, supported by more weighty authority than is the ingenious one of Metschnikoff.

I have thus forsaken the exact theme of my discourse from a belief that more benefit would be derived from the brief treatment of a subject, at best only partly understood by the highest authorities in this branch, but which one who has devoted much time in practical investigations must, necessarily, be better qualified to handle than the average practitioner.

Would the time (and, perhaps, your forbearance also) admit, much profit might be had from the further discussion of bacteria of the mouth, but the vast extent of the subject renders anything but a superficial consideration of it impossible.

As yet, we are only on the *frontier* of the domain of bacteriology, and have only obtained a comparatively few facts, or details, of this most interesting and important kingdom.

What data and facts, investigations into the interior of this boundless area of unexplored teritory of micro-organic life, will place us in possession of, time, perseverance and unremitting efforts will prove.

We certainly have reason to believe that the knowledge of such points, at present undiscovered, together with their practical application, will be of inestimable value to mankind.

In closing, allow me to express my gratification for your kind invitation to participate in the proceedings of your valuable and flourishing society, and to thank you sincerely for the close and courteous attention accorded to me to-day, and further, to record my obligations to one of your individual members, Dr. Hodge, who has rendered me every assistance possible in the collection of material for and in the preparation of this paper.

ASIATIC CHOLERA; ITS CAUSES AND PREVENTION.

BY DR. FREDERICK GAERTNER, A. M.,
PITTSBURGH, PA.

It was during the early summer of 1883 that Prof. Koch was placed at the head of the "German Cholera Commission," and sent into Egypt and India; in Asia he first unmasked this hidden enemy to mankind, the "comma-bacillus," commonly called the cholera germ (Fig. 1) for which Koch received the highest reward ever paid to a professional man, an "Honorarium" of 100,000 Reichsmarks; and upon his return to Berlin and the German Government, the rank of Privy Counsellor, and Rectorship of the Imperial Institute of Hygiene of the "Kaiser Wilhelm's Universitæt," of Berlin, was conferred upon him by the German Emperor.

Asiatic cholera, sometimes called Indian or Oriental cholera, cholera asphyxia, spasmodic cholera, malignant or pestilential cholera, and cholerine, all are identical one disease, an abnormal physiological action; a pathological condition in which the stomach and bowels are in a virulent infectious inflammation, the symptoms of which are vomiting and purging; both are characteristic in color, odor, and reactions of being choleraic discharges, this being followed by severe cramps in the stomach and bowels, and finally in the entire muscular system of the whole body, and especially of the lower extremities, (this condition is caused by a deficient and insufficient circulation in the extremities); by the enormous, copious diarrhœal dejections the greater part of the serum of the blood is thrown into the bowels by this virulent infectious inflammatory process, and of course naturally; thickening and stagnation of the blood within the bloodvessels, especially the veins, and heart, occurs; finally death. All of this might occur in a very short time, probably lasting from two to thirty-six hours, very seldom over that, only where taking a favorable termination.

These comma-bacilli (Fig. 1,—this being a microscopic specimen magnified about 600 times, and was taken from a person that just died from Asiatic cholera.) I had occasion to observe, and treat several cases during my sojourn in Strassburg, Elsas, and at Paris in 1883, and after making a thorough scientific post-mortem examination, including both a chemical and microscopical analysis of the excreta and secreta, I came to the determined and decided conclusion that this Asiatic cholera was a dangerous and decidedly a fatal malady; produced by the comma-bacilli, and that these germs are highly infectious, dangerous and very powerful. Their existence is generally found to be in filth, and filthy water, (moisture, etc.,) and of course with sufficient heat and moisture they soon develop into a dangerous infectious condition, in consequence of which cholera is both highly infectious and contagious, and is therefore only introduced into the human system by means of food and drink, such as water, milk, cream, fruits, vegetables, etc., etc.

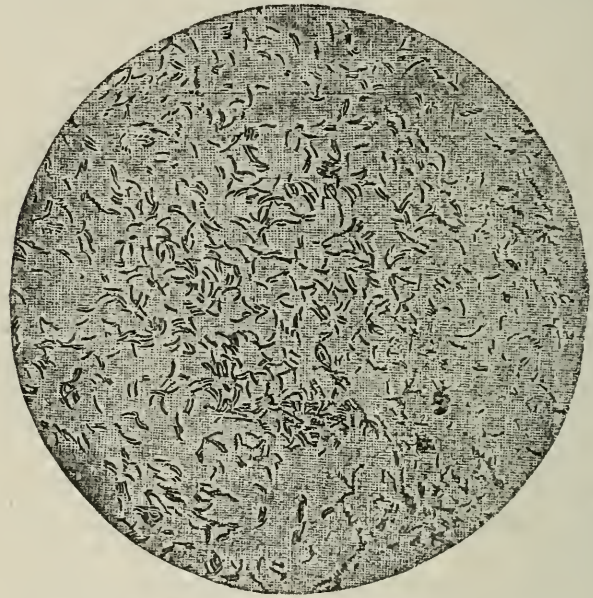

FIG. 1—COMMA-BACILLI, MAGNIFIED 600 TIMES.

Never by means of the atmospheric air! Never by means of coming in contact with other choleraic patients, never by sleeping in the same room or even in the same bed with other cholera patients is sufficient to produce cholera.

THE CAUSE OF CHOLERA.

Prof. Koch and other learned bacteriologists have already positively demonstrated that these germs, the "comma-bacilli," (Fig. 2 and 3), must be introduced into the human system by means of the alimentary canal, or per rectum, and there first develop this highly infectious inflammation of the entire intestinal and alimentary canal, particularly of the small intestines, the ilium, and the upper part of the caecum.

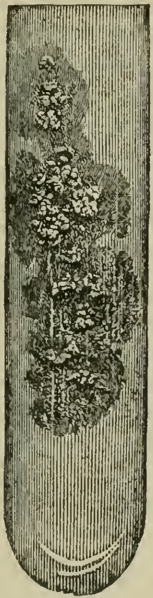

Fig. 2.—Test tube of pure culture of cholera gems.

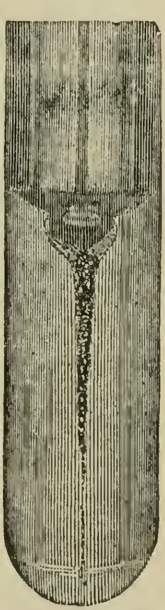

Fig. 3.—Test tube of culture of comma-bacilli.

By opening a body that just died from Asiatic cholera the following is generally found: The entire serous surface of the small intestines is of a dark rosy, fiery red color. The intestine is not distended with gas, but contains a large, sometimes an enormous quantity, of yellowish-white fluid, holding in suspension small white flakes, and hence presents a heavy, flabby, sodden appearance. The mucous surface of the small intestine is swollen œdematous, moderately congested, and may contain ecchymoses. The congestion and the extravasations are most marked in the lower part of the ilium, and are not usually present in either the large intestine or the stomach. The solitary follicles and Peyer's patches are, as a rule, considerably swollen, and are grayish in color. The mesenteric lymphatic glands are also moderately enlarged. The surface of the mucous membrane is coated with a tenacious mucus. By further scientific microscopical examination, there is found marked inflammatory charges in the intestinal coat, (that is, in the submucosa and muscular coat), an increased number of lymphoid cells in these coats and an accumulation of wandering cells, (white blood corpuscles), into the subserious tissue. The upper part of the glands of Lieberkuhn are devoid of epithelium and are filled with mucus. The epithelial cells lining the intestinal mucous membrane are extensively desquamated and are generally found in the intestinal contents, and especially in the excreta. This view generally prevails that this desquamation of the epithelium occurs during life, and constitutes a lesion characteristic of cholera. This in addition with the serum of the blood, holding in solution sodium chloride, ammonium, carbonate, mucus, granular matter, pus-cells, comma-bacilli, and some albumen constitutes this characteristic "rice water discharge," which is now so commonly called Asiatic cholera, or in a milder form, cholerine, as the French people are so inclined to call it !

THE PREVENTION OF CHOLERA.

There is no doubt that the best means of preventing the spreading of any infectious or contagious disease is to isolate and prevent other people to come in contact with the victims. By this I mean quarantine all traveling human beings, also the animals; especially when they come from an infected port or country, at least 60 to 90 days, each individual human or animal should be quarantined, and there carefully observed; all excreta and secreta, including all their clothing, luggage, baggage, etc., should be carefully and accurately examined by some learned microscopist and bacteriologist, and positively ascertained whether any comma-bacilli is found. Of course if any is found cholera is still to be feared. Then all precautionary, sanitary and preventive measures should be still applied until no more of the comma-bacilli can be discovered, *i. e.*, especially in the excreta and secreta, and upon the expiration of 8 to 10 days when no fresh comma-bacilli make their appearance "Cholera Asiatica" can then positively be excluded, and we may then prepare our prognosis and say that cholera is checked and no fear of an epidemic.

The strictest and most profound sanitary measures should be employed at all the seaports, railway stations, and state lines, even at the city limits quarantines should be established, and all the traveling public should be carefully examined, exposed to the most rigid cleansing, fumigation and disinfection. All the excreta and secreta, including the dead, should be carefully destroyed by cremation. Then all valued clothing, trunks, baggage, luggage, all imported goods, particularly clothing, dress goods, paper goods, rags, the mails, etc., etc., should be thoroughly disinfected, fumigated and exposed to extreme heat, say about 240° Fahr., for about two or three hours; then to extreme cold, say O Fahr. also during a period of six to twelve hours. Then there cannot be a possible chance for any comma-bacilli or germs and microbes, or any other micro-organisms to be still alive and active to further development, etc.

The disease "Cholera Asiatica" will then be in check and under control, and no danger of allowing this most dreadful of all infectious diseases to slaughter our innocent people by the thousand, which it would positively do if cholera will get a strong foothold in America.

PROFESSIONAL DIGNITY.

The relation of dentist to patient is peculiar, sometimes complex, occasionally embarrassing. Its tendency to the social, the sympathetic, and even to the pitiful, increases its delicacy, and whispers caution. Yet it is not difficult to an operator of sound mind and heart, and good common sense. If he is a true man, awkwardness will soon graduate to refinement, blunders to correct deportment, and embarrassment to ease. Experiment and a delicate discernment will tell him where to walk softly, when to use diplomacy, and how to produce trustfulness. But it is well for us all to keep in mind the difference between dignified familiarity and undignified intimacy. We must have an intuitive perception and an insinuating delicacy not developed in a coarse, vulgar nature. But where there is refinement there will be discretion that is pleasing, a delicacy of language and deportment that is winning, and a flow of wit, or of intelligence, or of society, that brings friendship, begets confidence and mitigates suffering.—Ed. *Items of Interest.*

IS PHRENOLOGY A SCIENCE?

BY G. T. HOWERTON, M. S.

Webster's definition of science is: (1) Certain knowledge; (2) A collection of the general principles or leading truths relating to any subject, arranged in systematic order. Let us try phrenology by these definitions. If it comes up to either one it is a "science."

Phrenology: *Phren*, the mind, *logos*, a discourse. Reader, do not the very origin and definition of the term catch your attention? The mind is the man—the substantial man which inhabits this material house.

> "Though I could reach from pole to pole,
> And grasp creation in my span,
> I must be measured by my soul;
> The mind's the standard of the man."

As far back as our literature reaches men have delighted to study *mind*. The best thinkers of all ages have given time and effort to the delightful task of trying to fathom mentality. Little by little the light had been turned on, until about one century ago Dr. Gall discovered the relation between the brain and the mind, and since that time great advances have been made. The materialists and the idealists have been coming together in this band of the phrenologists. The growth of the belief in phrenology is something remarkable, if we did not remember that the truth is always welcome. Half the people who hear of the science believe in phrenology. There are several reasons for this. Among others the following:

1. The people desire more knowledge of self. The great bulk of humanity can not go to the colleges and take classic courses; and, unless they do, they have no chance to be instructed in mental philosophy, since the theories of mind, outside of phrenology, are taught only in the A. B. course of the colleges. And many of those who do go to the colleges can not understand the old theories of psychology.

2. The people can comprehend phrenology and the explanations of mind given by it. This is an argument in its favor; one evidence, at least, that it is true.

3. Phrenology gives the common-school teacher, the uneducated parent, the kindergartner a basis for child culture which they can apply to practical use. See how it has reformed our educational

methods. When Horace Mann said: "He who disseminates true phrenology is a public benefactor," he had not begun to imagine how much influence this science would have in educational fields in the next quarter of a century.

Phrenology teaches that: 1. The brain is the organ of the mind. That is, the mind, the substantial, immortal part of man, uses the brain as its instrument of manifestation to this material world. Proofs: (*a*) Our consciousness. Every one who ever thought or felt, knows that he performs these acts with his head, and not with his heel. (*b*) Disease of the brain affects the mind. When the heel is inflamed, the lungs or even the stomach disordered, the mind remains clear and normal, but the instant inflammation touches the brain the mind tells it.

2. Size of the brain, other things being equal, is the measure of power. Proofs: (*a*) In all Nature's works this is true. The great oak is mightier than the reed of same material, large animals are strong, large beams support heavy weights. (*b*) In animals the strength of organic function is determined by size of organ. Large lungs give ease of breathing and speaking, a large stomach of good quality insures good digestion and immense vitality. (*c*) Great men have had large brains. Webster's weighed 64¾ ounces; Abercrombie's, 63 ounces; Spurzheim's, 55 ounces; Cuvier's 64½ ounces. The average is 50 ounces for the male brain.

3. The mind is not a single power, but consists of many parts or faculties, some of which may be strong and others weak in the same individual. Proofs: (*a*) Diversity of character. No two persons from Adam down to this day are alike. If the mind were a single faculty, people could differ only in power. There could be no diversity. (*b*) Partial genius. Or rather the fact that genius is always partial. Genius is a result of one or a few strong faculties. If the mind were a single power, as all mental philosophers taught prior to the discovery of phrenology, and as all still teach, who do not accept the truths of this science (either in name or in fact), we could have no genius but a universal genius, which is an absurdity.

4. Each separate faculty of the mind has its special centre of action, or organ, in the brain. Proofs: (*a*) A special organ for a special function is Nature's law. Eyes to see with, nose to smell with, and ears to hear with; and not one organ for all. (*b*) If each mental action used the whole brain, we could do only one

thing at a time. I could not think and write, for each is a mental action requiring brain activity. You could not eat and love your wife or mother, if both acts used the whole brain. (*c*) Dreaming can be explained only on the phrenological fact that each mental faculty has its part or organ in the brain. Dreams occur just before sound sleep, or just before awaking. The most active faculties of the mind and organs of the brain become quiet, "go to sleep" last, and awake first, hence the indistinct, partial, mental activity, called dreaming.

5. Faculties which are nearest allied to each other in mental action, have their cerebral organs grouped together. Proofs: (*a*) It is a law of Nature to place in juxtaposition those parts or things which are in perfect accord in their action. (*b*) Human heads differ in shape. If one has a strong intellect, he will have length of head in *front* of the ears (not necessarily a high forehead), if he is distinguished for deep moral and religious feelings, he will have length of head *above* the ears, if for a warm social nature, length of head *back* of the ears, if the selfish propensities predominate, breadth of head *between* the ears. If heads do not differ in shape because characters differ, no one on earth can say why they do so differ.

6. The quality of the organization determines the activity and endurance of the mentality. Proofs: (*a*) In schools those pupils of good quality of organization, not having been injured by tobacco, alcohol, bad feeding or inheritance, are the quickest, most active workers. (*b*) Those minds which are in sound bodies live longest here to engage in the daily toil for bread.

These are leading principles of phrenology, and each one is capable of much more extended proof than that given, but "two or three witnesses" seem sufficient.

In the natural language of the mental faculties we see a beautiful proof of the truth of phrenology. From this natural language arises physiognomy. Yet if the brain were not the organ of the mind, and if there were not different cerebral organs for each mental faculty, there could be no such thing as reading one's feelings and character from attitudes and facial expressions. But to the facts briefly. Why does one in thinking bend the head forward? Because reason is located in the top part of the frontal lobe of the brain, and the head inclines always in the direction of the active organ. Why is Heaven, with all that is pure, holy and good, upward? Because the cerebral organs through which man believes in and worships God are in the top part of the head. As a matter of fact, Heaven, as a locality, is no more apt to be above us than below us, and if it were above us now in twelve hours it would be below us, but in our thoughts and language it is constantly above us. But these thoughts and this language are the product of the human mind acting through the brain, hence the constant direction. Why does a bow of the head mean yes, and a shake mean no? Because when we assent, firmness, which is located on top of the back head, yields (negative action), and the head acts from that organ, but when we say no, firmness holds fast, and combativeness and destructiveness put the feeling into visible signs by the shake of the head. Notice if the denial is very positive the head will at the same time it shakes go backward and upward. The proud man carries his head up and backward because self-esteem is located in the back of the top head, while the humble man bows low because this faculty of mind is not active. And thus for the action of every single faculty of the mind. This action of the mental faculties through special organs, and the movement of the head and body in accord with that action, is a most interesting study, and enables all close observers to read something of each character met by his motions and facial expressions; but bear in mind that it is all based on the fundamental principles of phrenology, and every time you admit that there is anything in looks or actions you admit the truthfulness of our science.

The natural language of the mental faculties should be the basis for all gestures and all oratory, and when it is not there is apt to be a failure in the teaching of that branch. For the most part the teachers of elocution do not know that there are any mental faculties, and, of course, they cannot know the location of their special organs in the brain. Result: Our graduates in elocution are poorer orators than our four years old children.

Possibly the very best proof that "Phrenology is a science," is the perfect adaptation of the human mind as outlined by Dr. Gall's discovery to surrounding Nature. The human mind and all Nature came from the same hand and must be in perfect accord. As the old philosophers understood mind, and as the educators tried to bring mind and Nature together in the education of the young, there was no harmony—there was rather discord. The mistake arose from the false theories of mentality. The old theory was that the child mind is a blank, a tablet on which to write, a vessel to be filled. The phrenological doctrine is that the child comes into the world with all its mental faculties living activities, and that education is the feeding and developing of these faculties, not the filling of an empty vessel or the writing on a blank paper. On this truth of phrenology rests all the reform made in educational lines during the last half century.

From the phrenological analysis of the human mind it is believed that there are two leading departments, feelings and intellect. All systems of mental philosophy recognize these two as distinct, and phrenology demonstrates their existence from brain action. It also demonstrates the existence of many separate faculties as combining to make up each one of these parts. Whatever mind does it accomplishes through one of these primal mental faculties. Whatever is done to the mind must be done through one of these. The mind does not grow as a unit, cannot be educated as a unit, but by and through forty or more primal parts. One of these parts, *a mental faculty*, is so much of the mind as does a single thing. The faculties which do similar things are classed together and form a group of workers. For instance, the group through which we get ideas is the *perceptives*.

But through each one of these we get separate and distinct ideas. Each one does its own work. See how perfectly they adapt us to surrounding objects. They take hold of and tell us all about things. First, individuality teaches us of the mere existence of things as things. It is the noun faculty. In the infant it sees a light, a horse, a man, as a thing. Form tells us the shape of things; size, the extent; weight, their gravity; color, their hue; order, their arrangement, and number, how many.

Take up natural objects and apply these perceptives to them, then notice the changes which they undergo—this is done by eventuality—then work out the likenesses or differences which they bear to any or all other objects in nature—comparison—and finally note the effects which they produce—causality—and you use the entire intellect in the study of these objects of nature. This is natural, normal, education. This is from nature, not from books. The former education was bookish and impracticable, but the recent is from nature and useful.

Let educators take hold of the mind as it is outlined by phrenology and educate every part of it, each one of its separate faculties as a part, and we will begin to comprehend what can be done by and with the human mind. Let the feelings be educated as well as the intellect. Not only let all the intellect be used, as has been illustrated, but let all the feelings be guided, restrained, directed, educated. When this is done an educated man will be an honest man, will be pure socially, will be capable of complete self-government, will worship God, will see beauty in nature, goodness in man, and perfection in the Creator.

Phreno-Normal College, Buena Vista, Miss.

TREATIING AN EXPOSED, OR PARTLY EXPOSED, PULP.

First saturate the cavity with "heaven's" cordial, and a little of the following mixed with it; one part oil cloves, three parts carbolic acid made into a soft paste with tannin. If you have not heaven's cardlal, use in its place chloroform. Then clean away all debris from the cavity, as well as you can, without disturbing the pulp. Be careful not even to lift the thin, leathery layers of softened dentine from over or near it; for the less the pulp is disturbed the surer the treatment. Now, cut down weak walls, and be as thorough in preparing the capity for filling as possible, without impinging on the pulp. Rub a little of lhe obtundent in the cavity (but not enough to saturate), and over the flow a coating of chloropercha. Blow on warm air to evaporate the chloroform, and then fill the cavity with oxyphosphate, put in rather thin, so as to avoid all pressure, and also so that it will stick to the walls of the cavity.

In from four to six weeks the pulp will be incased in a beautiful tanned covering. This should not be disturbed. The best way is to have everything intact, except to remove a little of the oxyphosphate, so as to give room and undercut for a permanent covering of alloy of gold.

Before this, however, and during the healing of the pulp, there may be an accumulation of pus. If so, remove the temporary filling, thoroughly syringe with hot water, and after flowing over a little peroxide of hydrogen, then repeat the first dressing, though of course a favorable result is not so sure.—*Items of Interest.*

DENTAL EDUCATION.[1]

BY W. XAVIER SUDDUTH, A. M., M. D., D. D. S.[2]

The question of the relation of dental colleges to the State laws governing the practice of dentistry in the United States, has received considerable attention during the past year. It seems to me that nearly all who have taken part in the discussion, have viewed the subject in the wrong light. Instead of its being the State laws *versus* the colleges, it is the colleges, or a part of them at least, *versus* the laws.

The impression has gotten abroad that all the colleges belonging to the National Association of Dental Faculties are united in the opposition now being hurled at the State boards of dental examiners. This certainly is not the case in Minnesota. The law has no warmer supporters in this State than the Faculty of the College of Dentistry of the University of Minnesota. How many other colleges in the country, look upon the question in this light, I am unable to say, but I think that when the attitude of the different schools is canvassed it will be found that not a few are in favor of wise legislation on the subject. I do not think that the members of the boards should be brought into the discussion at all, except where it can be shown that they are not doing their duty. They are simply officers of the law, and have no option but to enforce it to the best of their ability, and they should have the hearty support of the people who enacted the law. As a rule, they are conscientious, capable men, who perform a thankless task at a considerable sacrifice both of time and means. From personal knowledge, I know that such is the case with the members of the board in Minnesota. Feeling the injustice of much of the criticism passed upon them, we took occasion in our last announcement to state the position of our school, in no uncertain language, as follows :

"The Faculty of this college recognizes the right of each State to control the practice of dentistry within its borders by regularly appointed boards of dental examiners."

There would be just as much injustice in abusing a policeman who should arrest you for breaking a well known city ordinance, such as fast driving, for instance, as to blame the members of the boards for executing the law as they understand it. It is the law, then, that we have to deal with, and not the State boards.

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[1] Read before the American Academy of Dental Science. April 6, 1892.
[2] Dean of the College of Dentistry of the University of Minnesota.

What is the history of the enactment of the laws found on the statute books of nearly all the States at the present time? It has been one of self-defence in nearly every case, for as time went by States without laws found themselves "becoming the dumping-ground for the charlatan and the ignoramus who had been driven out of other States." The enactment of laws governing the practice of dentistry in a few States forced all the rest to legislate against empiricism as a matter of self-defence.

As the standard of dental education has advanced, the laws enacted have, in most cases, become more rigid in their requirements, and many that passed laws early in the history of dental legislation are now finding them inoperative, to a greater or less degree, and are seeking to amend or entirely replace them. These laws are passed for the protection of the people, and not for the interest of dentists or dental colleges. A few of the States, recognizing the value of a college education, have thrown such restrictions around the privilege of examination as to debar all but college graduates from availing themselves of it; the medical law in Minnesota states explicitly that none but college graduates are admissible for examination, and prescribes the length of course which must have been pursued; while the dental law allows a little more leeway, yet it does virtually the same thing by making the time of credit for practice an increasing one from the date of the enactment of the law, which will in time debar all but college men from entering practice in the State.

New Jersey has also placed a premium upon a college education, and a large proportion of the States, in accepting college diplomas for registration without examination, have acknowledged the value of college instruction.

All these advances have been made by the several States voluntarily, under the impression that the colleges would appreciate them and fulfil the trust bestowed in them. The administration of the law in States that require all candidates to pass an examination has shown that not all incompetents were non-graduates, fully as large a proportion coming from the so-called reputable colleges.

It was found that a very large proportion of men presenting with diplomas were not, in the judgment of the members of the boards, safe men to intrust with the care of the mouths of the citizens of their State. The result has been widespread distrust in the honesty of the intentions of some of the colleges, and a growing impression that the only safe way to guard against the admission of incompetents is to require all candidates to pass an examination before being granted a license to commence practice.

What has brought about this change in the attitude of the State laws towards the colleges? Nothing else than the flagrant abuse of the confidence which was at first shown in the colleges. They are now only reaping the reward of a betrayed confidence. The seed of distrust has, however, been sown, and will, under the same law of self-defence which caused the enactment of the laws in the first instance, require the amendment of existing laws until all the States will require all candidates to pass a test examination. Thus are the many made to bear the sins of the few.

Should such a condition come to pass, it would be nothing more, however, than is required of our sister professions; laws for the control of the practice of law even more rigid than have been established in any State for the practice of medicine or dentistry have long been on our statute-books. Graduates of all our law schools must, after graduating, pass an examination. They must, in addition to legal fitness, possess and maintain a good moral character, or they can be "disbarred" at any time. If they desire to remove, they must obtain a certificate from the court before which they were admitted to practice for registration in another State. If they desire to practise in the Supreme Court of the United States they must sustain a good reputation for a specified time, and then pass a second examination to show their fitness for the higher courts. We hear nothing from Columbia, Harvard, or the University of Pennsylvania about the non-recognition of their legal diploma, and why should such an outcry be made against those States that see fit to require college graduates to pass an examination before granting them licenses to practise dentistry?

If a graduate of the College of Literature and Arts of Princeton, Yale, or the University of Pennsylvania desires to teach a district school in the backwoods in Illinois, he is required to pass an examination as to his fitness to do so before the county superintendent of schools, which must be repeated every two years. It is true that he may pass the State examination, which will give him immunity for five years, and still we hear nothing from their *alma* *mater* in behalf of these much-examined candidates who thus enter into competition for a share of the public funds. If, then, a legal or literary diploma does not carry any power to license the possessors to practise, teach, or preach, why should a dental diploma authorize its possessor to practise dentistry in any portion of the United States he may fancy, and become a perpetual license at that, as some would have it? What is there in dental education that makes a man non-amenable to the laws of the State in which he desires to practice? The situation is unique and plainly absurd on its face. There is no reason in asking that graduates in medicine or dentistry should be granted favors that are not accorded to law or literary graduates. Both the latter professions afford much greater opportunity for injury to the people than does the former.

If a man wants to employ a lawyer or a teacher, he can take his time to inquire into their qualifications, but if he gets sick or has a toothache, he has, many times, to employ the first one at hand and trust to luck for the results.

In that degree that a profession has to do with the public weal, so should the restrictions of law be thrown around its practice. A medical or dental diploma should represent the standard of education in the institution granting it, the same as a law or literary diploma, and no more. It should not carry with it the license to practise outside of the State in which the institution is located, and here in Minnesota we do not ask even that, but require graduates of the University to pass before the State Board just the same as other candidates, and, what is more, we find it beneficial in that it helps us to maintain a high standard in our own college.

To grant more than exemption from examination to its graduates in its own State, would allow an institution to set the standard of education in other States, and would be in distinct violation of the right of each to control its own internal affairs. This privilege is one of the most cherished rights reserved to each State as it enters the Union. It has called forth more discussion than, perhaps, all the other clauses of the Constitution. More eloquence has been spent and more legal acumen brought to bear upon it than any question relating to State comity. There is no question that is guarded by the State more jealously than the right to regulate its own internal affairs, none that its citizens would sooner shed their blood for, except, perhaps, to defend the nation's interest. The close scrutiny and the legal discussions that have been handed down in the past have so defined its powers and limitations that it hardly seems possible that a break could be made in the claims made by the several States in this direction.

A quite recent decision in the United States Supreme Court bearing directly upon the point in hand was handed down in the "Original Package" discussion. In this case certain parties doing business under charters granted by the State of Illinois tried, under the head of "Inter-State Commerce," to force the sale of high wines and whiskeys in the original packages on the market in the State of Iowa when the people of that State had said by legal enactment that they did not want them. This was the last stronghold of the opposition, and unlimited means were expended by these wealthy corporations to gain their point. The decision was, however, adverse to their interests, the Court holding that the State of Iowa had not only the right, but the power, to control the liquor traffic within its own jurisdiction. Various other attempts have been made within the past few years under the same head, but invariably with the same result. The motive in each instance has been a mercenary one. Strong corporations have been willing to override the will and the good of the people in order that they might make a few more miserable dollars.

Let us see if we can find a parallel in the case in hand. Certain colleges doing business under charters granted them in the States in which they are situated find that the people in other States, for their own protection, are enacting laws that interfere with their business of producing dentists, in that said laws place a restriction on the absolute free entrance of their graduates into said States for the practice of their chosen profession, and they therefore threaten to force these States to give up their inalienable right of attending to their own internal matters, because in so doing they have run counter to the interests of a few private business corporations.

In what way have the laws interfered with their business? They have only said that the quality of the product of dental colleges, like that of other institutions, say creameries, must reach a certain grade or else it cannot find place on their markets.

Do the laws anywhere prevent the entrance of thoroughly qualified dentists in practice? Not in a single instance; on the other hand, such are heartily welcomed. If such is the case, then the inevitable result of the operation of dental laws will be to send a student to those institutions that can assure him such preparation as shall fit him to pass the dental board of the State of his choice, otherwise his diploma, obtained "at so much cost of time and labor," would be "worthless so far as permitting the holder thereof the right to practice." This would certainly be the case unless the individual could demonstrate that he was possessed of the qualifications which his diploma claims for him, and if he had them in his head and at his fingers' ends, it surely would be no great task for him to prove to any State board that he was really the individual named in the document. To do this would not require more than a few hours time, and would surely be worth the effort just to get the signature of the secretary of the board, who is a legal representative of the law.

From some of the discussions on this question it would seem that there is doubt as to the "keeping qualities" of the product of some of our colleges. Granting that it is "A No. 1" when put out as shown by the document duly signed and sealed that is sent with each package, it might be well to establish a system of "rapid transit" from the "diploma mill" to the offices of the State boards in the several States; and as a product in some instances seems very likely to deteriorate in transit, as has been shown in the case of our own State examinations, were as high a proportion as five in nine failed to pass inspection, it does seem that it might be well to establish a system of "refrigerator cars," and for the moral influence it may have label each separate consignment "Original package."

But, jesting aside, the question as I look at it, when stripped of all prejudice, has a purely business aspect, to which let us turn our attention for a moment and see what light we can gain thereby. The strongest opposition to the enactment and enforcement of State laws governing the practice of dentistry, is found in those schools that hold their charters as "private institutions," and who look upon their "plant" as a "vested right." They are in the business of turning out dentists, and they naturally desire to do so at the least expense possible, consequently are opposed on "business principles" to all State regulations that look towards the elevation of the standard. They went in with the rest for a three years' course because that played right into their pockets. Students must now remain one year longer in attendance, which means more time in the infirmary and an additional year's fees. But to raise the standard would require a selection of the material to be taught and better facilities for instruction, all of which would increase the expense and lessen the profit. The rejection of poor material by a higher entrance examination, would lessen the number in attendance, and consequently cut down the *profits* of the infirmary. Then again, improved facilities would incur considerable expense, which would have to come *directly out of the profits* of said infirmary.

The plain statement of the facts of a case, are never agreeable to all concerned, but it does seem to me to be about time to draw a line between the really professional schools and the "dental infirmaries." Exposures are never pleasant tasks, but when it is currently reported that one institution cleared sixteen thousand dollars in its infirmary during the session of 1889-90, and twenty thousand dollars in 1890-91, and that another reached the fabulous sum of thirty-six thousand dollars for 1888-89, and with the same management and an increased attendance of students in 1890-91 there was, in all probability, a proportionate increase in infirmary receipts, it does seem time that some one should call attention to the subject. Many other instances of the abuse of the dental infirmary might be cited, but these well-authenticated cases will suffice for my purpose.

I do not think there is any risk in saying that the cause for most of the opposition to State dental laws at the present time lies in the pernicious influence of our dental infirmary system. A mercenary spirit has crept into our colleges through the "open door" of the infirmary, in many instances completely overshadowing the primary object for which they were established.

A close analysis of the opposition to State dental laws will show any fair-minded man that the strength of the opposition bears a very close relation to the size of the balance-sheet of the infirmary of the college. This is quite natural, as the larger the profits the more at stake, and also the greater amount of ready cash on hand with which to obstruct dental legislation. In some instances this has not been confined to the bounds of their own State, as some institutions have gone outside and used means to prevent the passage of laws which the people of a sister State, had framed in its interest, because the enactment of such laws would, to a greater or less degree, be inimical to the interests of said colleges.

The remedy for the situation lies in supporting just laws in every State in the United States. It is not essential that these laws should be uniform. Uniformity means a compromise, a lowering of the standard, and would militate against progress. Let each college do its duty by its students and come to the standard set by the most rigid law, and there will be no more need of complaint. It is impossible to harmonize the differences between the colleges and the State boards in any other way. The members of these boards have no option in the matter. It is their duty to execute the law as they interpret it. It has been said that at the meeting at Saratogo last summer the National Association of Dental Examiners "refused absolutely to be a party to any compromise." What else could they have done? They did not make the laws. What would "perfect unison" in such a case mean other than that the officers of the law had conspired to defeat the wishes of the people as expressed in the law? It has also been said "that a truce has been arranged for the present;" said truce is, however, only a "recommendation," aud not mandatory upon the boards of the several States. The Board of Dental Examiners of the State of Minnesota has been compelled to send its resignation to the National Association because it could not comply with that portion of the recommendation referring to a partial report of the work of the board, our law being explicit on this point and requiring a full, detailed report.

I cannot see wherein "the interests of all are jeopardized by the present antagonistic position," as is held by some. I am sure the State boards can stand the antagonism. They have nothing to fear. So long as they faithfully perform their duty the people will stand by them, and if much more opposition is made to the execution of the law so as to increase the labors of the boards, they will vote them an increase in salaries. Outside opposition is the strongest argument to the people of the necessity of dental legislation. On the other hand, only good to the dental profession can come from a free discussion. The attitude of the different colleges will be shown, which will, in the end, work to the elevation of the standard of dental education. Some very plain words will pass before the question is settled. It is needless to look for any compromise steps to be taken by the States in the matter. The colleges might just as well accept the situation at once and take such action as will put them in harmony with the law. The interests of the many cannot be sacrificed for those of the few. I consider that the future is bright for the scientific advancement of dental education in this country.

ANOTHER CASE OF INSANITY CAUSED BY NITROUS OXIDE GAS.

Miss Lizzie Lots, the beautiful daughter of Mr. Otto Lots, a prominent citizen of Covington, Ky., is now at College Hill Sanitarium receiving treatment for her mind. The family claim that Miss Lots became insane through taking nitrous oxide gas for the extraction of two teeth while visiting at Indianapolis.

Her sister noticed her condition of mind, and immediately sent her home. She seemed to be all right for a few days, but occasionally claimed that she had gas in her head. She would tell her father that he was to be the next President of the United States, and that he would reappoint Mr. Hardeman as postmaster of Covington. Again, she would talk on all sorts of financial schemes of great magnitude. Her condition finally became so alarming that her folks were compelled to remove her to the sanitarium for treatment. She now speaks of the sudden spells she had at home. Her father is confident that her malady was caused by the taking of gas and pulling of her teeth. He declares that the girl was never sick in her life before, and that her mind became impaired immediately after she had her teeth extracted.

Mr. Lots is borne out in his statements by his other daughter, who lives at Indianapolis. She is a favorite child, and her venerable father is almost prostrated over her condition. He has given her all the medical attention that he can, but grave fears are entertained as to her ultimate recovery. She is well known among the people of Covington, and had a successful business. Her father is enraged over the treatment she received at the hands of the dentist in Indianapolis, and he has employed Senator Goeble, of Covington, to bring an action for damages against him.

Miss Lots is a striking beauty and highly accomplished in music. She is about twenty-two years of age, and a brunette of purest type. She is very popular among all her acquaintances, who will be surprised to learn of her distressing malady. Her parents reside at 1003 Greenup street, Covington.

SYSTEMATIC READING.

In this age of progress, we believe that every intelligent and ambitious dentist is a constant subscriber to one or more journals. Some take a number, and during the month make the effort, at odd times, to assimilate and digest their contents. Others read their journal through as though it were a novel, and then place it upon the shelf to be bound at the end of the year, and add another volume to their, to them, useless library. Others read with system, and with an object in view, hence, gain education, not simply information—two decidedly different results. A man's library is valuable to him in just such a degree as he has command over it; and, while it is impossible for him to be the possessor of its entire contents, it is possible and easy for him to have this amount of knowledge so under his control as to be able to lay his hands, in a few moments, upon the literature of any given subject. As one point in the different suggestions that might be made to attain this end, we would suggest the following: Go to a wholesale stationer, buy a plainly-ruled 250-page day-book; have it indexed throughout, thus forming a large index, with an average of about ten pages to each letter of the alphabet. Every month, as your journals are read, note such information as is important, worthy of remembrance, and liable to be of future use to you. Classify these articles under certain heads that will be suggestive and lead to their being readily found when wanted, and enter them alphabetically in your index. You will be astonished how soon these pages will fill up, and how useful and labor-saving they will prove to you.

As a sample of the utility of such an arrangement, we will suppose that one has received a notice of the monthly meeting of his society, and that Dr.—— is going to read a paper upon "Diseases of the Maxillary Sinus." In order to appreciate and be entertained upon such a subject, to say nothing of placing yourself in a position to discuss the subject intelligently, it is necessary that you are conversant with what has already been written. In a short time, by turning to your index, you note, under the heading "*Antrum*," the literature of the subject. Try it for awhile; there will be no fears about your continuing the habit.—*The Dental World.*

THE DENTAL AND SURGICAL MICROCOSM.

A QUARTERLY MAGAZINE.

CONTROLLING EDITOR, - - - - - - SAUEL J. HAYES.
ASSOCIATE EDITOR, - - - - - FREDERICK GAERTNER.

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EDITORIAL REVIEW.

We would especially call attention to the excellent article of Dr. E. J. Buck, of Massachusetts, on "General Anæsthesia." The Doctor has evidently given much thought to the subject and been a close observer of results. He agrees perfectly with Dr. Woods, Jeylet and Blanck, and others, as to the results produced by the administration of nitrous oxide gas, and in common with them and us condemns its use for the pretended purpose of producing anæthesia. Dr. Buck also states that "several observers have found large quantities of sugar in the urine of patients after the inhalation of the gas, and from good authority, come cases of permanent impairment of health dating from the same, such as menstrual suppression, epilepsy, diabetes, albumen in the urine, and indeed pulmonary affections, with one or more cases of miscarriage," which would be the natural tendency and result in those of weak constitution, or where the organs of elimination are impaired or weak. The deprivation or robbing of the blood of free oxygen by the administration of nitrous oxide gas, or any other asphyxiating agent, would naturally tend to bring about such results, as well as insanity and death.

Again, the Doctor recognizes the fact on page five of his article, that "some subtle, primordial influence" is exerted "upon the nerve centres," but fails to recognize the subtle agent exerting this influence; and yet thinks it "of little account, since we do not look in that direction for a failure of the vital forces."

Will the Doctor kindly tell us in what other direction we shall look for a failure of the "vital forces?"

The *force* that propels the *vital organs* in their functions, whence cometh it? It will not answer to say that life is that force, and that we do not know what life is. Life is not force; neither is force life; but force may make life manifest. Material force can only be made manifest by a change of substance that is commonly recognized and named "molecular motion." Yet no one has ever seen a molecule, or an atom, and can have no correct idea of their existence. But we all know that what we are pleased to name material force, which is known by its power over matter, is unmistakably the result of a change of some subtle substance. There is a form or manifestation of force that we have named electricity, or animal magnetism. This force is developed in every animal by the cerebral glands of the brain from the basic element oxygen which is obtained in a free state from the atmosphere taken up by the blood and carried to the brain,and which is the force of life, or that out of which vital force is generated or made manifest. This *vital force*—animo-electricity and brain—are evidently presided over and controlled by the mind or spirit. Hence the mind may be said to be the governor of the battery (the brain), and the director of this vital force or nervo-vital fluid. And of this, we have as clear and undeniable evidence as we can possibly have of the existence and functions of anything that we cannot classify as material. The mind first conceives, then operates upon the cells of the brain (the animal battery for generating animo-electricity), in such a manner as to send the electricity out in the motor nerves which are required to move the organ or organs in their functions. Thus the musician (his spirit or mind), conceives a tune; he then executes it upon the violin. But by what means or in what manner does his mind or spirit produce this result. Can there be any other means of making manifest the will of the mind, other than that of the spirit or mind operating upon and through material force upon matter?

If not, then the only question to be raised is, how can and how does spirit operate upon and through material force? That it does operate thus to move matter no one will question. I exert the will,attribute of the mind to raise my arm, and I raise my arm. But although the paralytic may exert his will to raise his arm, it does not raise; and why not? Simply because there is an interruption in the neural or electric current at a sub-ganglionic nerve center, beyond which the electric current cannot flow in sufficient volume to make manifest sufficient force to raise the arm. But my mind operates somehow (and how we cannot tell), upon the precise cell, or cells, of the brain, to send out this nervo-vital fluid or animo-electricity into the precise motor nerve, or nerves, necessary to move the various muscles of the arm to raise the arm, and the muscles mechanically raise the arm. But the force is communicated through the mótor nerves by the mind directing the current of electricity. If the heart or lungs be interrupted in their functions, it must be by interrupting the neural current in the motor nerves controlling these organs. But we know of but two ways by which this current can be interrupted. First, by impoverishing the battery (or brain), by either withdrawing the blood, or robbing the blood of the free oxygen necessary to support combustion and sustain life. When this is done, then the respiratory organs cease their functions.

Second, by producing a shock or concussion and revultion in neural circulation. This can only be done by one of two agencies, or both combined. The one is internal—the mind—the other is external—chemical or mechanical—and in no other way is it possible to cause a cessation of the functions of either the heart or the lungs.

Dr. Buck says that (page five), "experience teaches that with ether, as with nitrous oxide, the greatest danger is from paralysis of the respiratory nerves." This is true, undoubtedly, of ether in many cases, as well as with nitrous oxide gas in all cases; for the simple reason that when ether is administered with cone sponge or napkin, as it has hitherto been, the atmosphere is so heavily laden or charged with the ether that the greater part of the oxygen due to support combustion and life, is excluded from the narcotized air, and asphyxia is produced instead of anæsthesia, and oft-times death with both ether and nitrous oxide gas.

There is very little danger of death from shock with ether or nitrous oxide. The chemical action is not sufficient to produce concussion and revulsion, while that of chloroform is. Hence the great majority of deaths from chloroform occurs in the first stage of administration, and when that shock is sufficient the heart's functions cease first.

The *nausea* referred to by Dr. Buck as a consequence of the almost constant "stream of ether-laden saliva which will be swallowed during the first stages of anæsthesia, and acting as a local irritant upon the the gastric nerves," causes nausea. This can be overcome by the "Hayes Process of, and Apparatus for Generating and Applying Anæsthetics," whereby the anæsthetic is brought to the patient in a gaseous form.

Dr. Buck's suggestion, as to the proper temperature of the room having much to do with the evaporation of the ether, or any other narcotic, and as having much to do with results, should have more serious consideration. That difficulty is also overcome by the Hayes Process and Apparatus, in having a bath connected therewith to regulate by heat applied, and a thermometer to register the temperature. The Doctor speaks of mechanical asphyxia in such a manner as to leave the impression that there are different kinds of asphyxia, or different causes of that result. I know of but one physical condition that is properly named asphyxia, and I know of but one way of producing that condition, and that is by depriving of the due quantity of oxygen.

Again, the Doctor speaks of cardiac syncope in the same manner. But, I only know of but one condition that can be truly and properly recognized as a state of syncope, and but one agency by which it is brought about. Primarily, the mind, and its action, are concerned in producing that physical condition. Hence, such expressions as *cardiac syncope*, *chloroform syncope*, etc., are misleading and have a tendency to confuse the student rather than assist him in a true knowledge of the art and science of anæsthesia. In the study of this important science, it is of paramount importance that we keep constantly in sight the relation of cause and effect. This would enable Dr. Buck to see why ether depresses the action of the respiratory organs so frequently by the tendency to asphyxia in over-charging the air with the drug, and why in the administration of aerated ether, when a death occurs, the lungs generally cease their functions before the heart's action ceases. Also, why it is that the heart ceases its functions usually first in a death from chloroform, as it is in consequence of the shock produced by the chemical action of that powerful drug as ordinarily administered by cone, sponge or napkin, especially in the hot season of the year. The Hayes Process and Apparatus entirely overcomes these evil effects by controlling the percentage of the drug, and in adapting the administration of the narcotic to the patient. No matter how delicate the patient may be, it can be applied with perfect safety.

DEATH FROM SYNCOPE.

On the 9th of August last, Dr. E. A. Guilbert, a prominent physician of Dubuque, Iowa, gave what is known as the A. C. E. mixture, to Mrs. J. C. Fitzpatrick, of same city, aged about thirty years, in good health, for the painless extraction of teeth, in the office of Dr. J. V. Conzett, a prominent young dentist in Dubuque, who extracted the teeth. The lady is thought to have been under the influence of the anæsthetic about twenty minutes, and yet was capable of resisting the efforts of the dentist at least part of that time, and seemed to have partially recovered from the effects of the anæsthetic, when all of a sudden she ceased breathing.

We further learned from both the dentist and physician, that there was positively no purpleness nor deathly pallor till after the functions of life had ceased, which is abundant evidence that the patient was not asphyxiated by the anæsthetic.

Again, it was quite a little time after the anæsthetic had been administered, before the heart and lungs refused to perform their functions, which precludes the possibility of the death from what is commonly called a shock from the chemical action of the drug. Therefore, if neither asphyxia, nor paralysis of nerve center by the anæsthetic, were produced, then the anæsthetic could not have killed the patient. Hence, the patient must have died from syncopy, with partial narcosis. As syncope is always produced by the mind, or an acquiescent condition of the mind, the probability is that the strange sensations of the anæsthetic as felt as the patient was recovering consciousness, caused fright and syncope, which with partial narcosis, is a very unsavory condition, and should always be obviated by the administrator describing the manifestations of the anæsthetic. If this be neglected before administering, the patient having heard of deaths from anæsthetics, or so-called anæsthetics, would very naturally think that the pricking sensation and numbness, or strange, cold, numb feeling creeping all over, were but the chills of death, and be terribly frightened and faint.

The only censure in the above case would be for not having the corsets and skirts properly loosened, and the necessary agencies at hand to resuscitate the patient, and perhaps not having properly described the manifestations of the anæsthetic when about to administer. Yet it is due the physician and dentist that when they discovered the perilous condition of their patient, that they used every available means of resuscitation, and yet without success.

SUDDEN DEATH.

Mrs. Kate Ledbetter, daughter of Peter McCue, who lives near Oakford, died in Dr. Solenberger's dental office Wednesday evening, while under the influence of an anæsthetic, which, at her request, had been administered by Dr. Whitley, preparatory to having some teeth pulled. Coroner McAtee held an inquest, at which it appeared in evidence that the usual precautions had been taken, before and during the administration of the anæsthetic, which Dr. Whitley stated was hydrobromic ethyl, used for short operations. The coroner's jury was composed of Z. A. Thompson, foreman; A. E. Estill, E. H. Bigelow, Mat. Hainsfurther, E. R. Oeltjen, H. C. Levering. They returned the following verdict.

"We, the undersigned, jurors, sworn to inquire of the death of Mrs. Kate Ledbetter, on oath do find that she came to her death by paralysis of the heart. We further exonerate all parties from blame."

The body was taken to the residence of J. D. Roberts, where it was prepared for burial by undertaker Conant, and taken to Oakford on Thursday morning's train, the funeral occurring yesterday.

The deceased was the wife of Frank Ledbetter, a Wyoming ranchman, and was here on a visit. Her husband was coming through to Chicago with a shipment of stock and was to stop here on his way home. Mrs. Ledbetter was about thirty years of age.—*Democrat*, Petersburg, Ill.

The above verdict is a sad comment upon the intelligence of the coroner's jury. Did ever any animal or man die without the heart being paralyzed? The object of a coroner's jury is to ascertain the cause of the death, if possible, and to designate the cause in their verdict. The lady died, but what caused the paralysis of the heart or death? Was it the drug administered, or the manner of making and administering the anæsthetic that caused the death; or did she die from syncope? Why not give an intelligent account of the administration and effects of the agency, and of what was done to save the life of the patient? These grave offences should not be covered up. Death under such circumstances should not be winked at or the cause withheld from the public.

FACTS OR FANCIES, SCIENCE OR THEORY, WHICH?

An ordinary observer, in looking over the pages of the numerous dental and medical journals, and into the various medical and dental conventions, cannot fail to be impressed with the superficial character of the work done, and of the manifest distasteful desire for commendation, rather than the development of truth and a clear and unmistakable conception of cause and effect, in relation to physical conditions.

The author, or publisher of an essay, or book sends a copy to the editor of a journal (complimentary) and expects the editor to speak of it in his journal. This is all very well. But should the editor have nerve and ability to express, in his review of the essay or book, the errors or fallacies set forth, then how strangely the author, his friends, and the unthinking public will characterize him as ungentlemanly, cruel, and as being void of principle; instead of giving credit for his manly and scholarly efforts in developing the great truths so important in promoting science and arts. Our friend, Dr. W. C. Barrett, in the following brief editorial, in *The Dental Practitioner*, very forcibly presents this fallacy:

PROFIT OR PRAISE?

In reading the discussions of papers in some of our dental societies, one is too often impressed with the conviction that the whole is but a farce. This is largely the fault of the writers themselves. They will ask for a thorough discussion, when that is the very last thing they want. They express a wish that the essay may have consideration, when they really mean compliment. They invite controversy, but will accept only commendation. They pretend they want truth, when taffy is what they are after. There is no real discussion unless the other side is brought out, and if this is done some authors make it a matter of personal offense. There is nothing to be learned from an echo. You get no benefit from the man who stands behind you. It is he who confronts you, who stands foot to foot and eye to eye with you, from whom you gather inspiration. Until you meet an adversary there is no opportunity to try your mettle, and to find out whether your sword is made of lead or keen steel. One never discovers the really weak spots in his armor until he has been in action. So you can not tell whether your finest spun theory will stand the test until it has been submitted to the fire of real criticism, and that is what the sincere student and seeker of facts should desire above all things.

"Why, Nixon! what's the matter? You're as thin as a rail."

Nixon (the editor)—"Well, I'll tell you. The Screecham Pill company advertised with us and we took it out in trade. I couldn't sell the pills, so have been trying to use them up myself."—*Judge*.

PUBLISHER'S ANNOUNCEMENT.

We take pleasure in announcing that with this number we terminate the second volume of THE DENTAL AND SURGICAL MICROCOSM, that the third volume may commence with the first calendar month of the year and, hereafter, terminate with the calendar year. This is thought to be advisable, for several cogent reasons, besides complying with the expressed wishes of many of the subscribers, in so doing. We have with this number given the title page and index to volumes 1 and 2, that those who desire to have them bound in book form, may do so under one cover.

In the future, as in the past, it will be the sole aim of the editors and publishers to make THE DENTAL AND SURGICAL MICROCOSM both progressive and aggressive; pre-eminently scientific, and yet independent in all its literature and relations; belonging to no school of dentists or physicians, but advocating, in all respects, advancement and a higher education, and standing for all in their relation to science and art. In brief, it will ever aim to be worthy of its mission, and a place in every physician's and dentist's library.

Therefore, it is of very great importance that all who are desirous of studying the art and science of anæsthesia, or hypnotism, from the most modern standpoint, and of learning of the most recent developments in the art and science, as well as of studying physical diagnosis in producing this very desirable physical condition safely, and of noting closely cause and effect, and of learning how to obviate unpleasant results, and how to obtain, with certainty, the desired condition, that they should at once send in their subscriptions for volume third, so that they may make sure of obtaining the entire volume. We regret that we could not supply some of the numbers of volume first to our late subscribers. We did not anticipate the very great demand that followed our first published numbers. Therefore, many were dissappointed very much in not being able to secure Nos. 1 and 2, of Vol. 1.

Hence, we say to all, send in your subscriptions early, that you may not be dissappointed.

WE regret that the article sent us by S. R. Holden, D.D.S., of Duluth, Minn., giving the particulars of the recent death from nitrous oxide gas in Elmira, N. Y., was misplaced. We wrote for a duplicate copy, but as our printers are going to press, we shall have to defer it for next issue.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

The Ninth Annual Meeting of the National Association of Dental Faculties was held at the Cataract House, Niagara Falls, commencing Monday, August 1, 1892.

Twenty-six colleges were represented, as follows:

BALTIMORE COLLEGE OF DENTAL SURGERY.—R. B. Winder.

BOSTON DENTAL COLLEGE.—J. A. Follett.

CHICAGO COLLEGE OF DENTAL SURGERY.—Truman W. Brophy.

HARVARD UNIVERSITY, DENTAL DEPARTMENT.—Thomas Fillebrown.

KANSAS CITY DENTAL COLLEGE.—J. D. Patterson.

MISSOURI DENTAL COLLEGE, DENTAL DEPARTMENT OF WASHINGTON UNIVERSITY.—W. H. Eames.

NEW YORK COLLEGE OF DENTISTRY.—Frank Abbott.

OHIO COLLEGE OF DENTAL SURGERY.—H. A. Smith.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.—C. N. Peirce.

PHILADELPHIA DENTAL COLLEGE.—J. E. Garretson.

UNIVERSITY OF IOWA, DENTAL DEPARTMENT.—A. O. Hunt.

UNIVERSITY OF MICHIGAN, DENTAL DEPARTMENT.—J. Taft.

UNIVERSITY OF PENNSYLVANIA, DENTAL DEPARTMENT.—James Truman.

VANDERBILT UNIVERSITY, DENTAL DEPARTMENT.—W. H. Morgan.

NORTHWESTERN COLLEGE OF DENTAL SURGERY.—B. J. Roberts.

LOUISVILLE COLLEGE OF DENTISTRY.—Francis Peabody.

INDIANA DENTAL COLLEGE.—J. E. Cravens.

NORTHWESTERN UNIVERSITY DENTAL SCHOOL.—E. D. Swain.

DENTAL DEPARTMENT OF SOUTHERN MEDICAL COLLEGE.—William Crenshaw.

DENTAL DEPARTMENT OF UNIVERSITY OF TENNESSEE.—J. P. Gray.

SCHOOL OF DENTISTRY OF MEHARRY MEDICAL DEPARTMENT OF CENTRAL TENNESSEE COLEGE.—G. W. Hubbard.

UNIVERSITY OF MARYLAND, DENTAL DEPARTMENT.—John C. Uhler.

COLUMBIAN UNIVERSITY, DENTAL DEPARTMENT.—H. C. Thompson.

ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.—J. Branston Willmott.

AMERICAN COLLEGE OF DENTAL SURGERY.—John S. Marshall.

UNIVERSITY OF DENVER, DENTAL DEPARTMENT.—George J. Hartung.

The *ad interim* committee reported that it had investigated a charge preferred against the University of Maryland, Dental Department, by the College of Dentistry of the University of California, of graduating a person in less time than the rules demanded; that it found that no rule of the Association had been violated, and had so reported to the parties in interest; that it had dismissed an effort for the reinstatement of the American College of Dental Surgery, Chicago, as not within the jurisdiction of the committee, with the advice to reorganize the college before attempting to influence the Association to change its action, which reorganization has since been accomplished.

The committee also stated that its value in settling such matters had been made so clearly apparent that it recommended that it should be made a standing committee, to be elected by the Association, instead of being appointed by the president.

The report was received and placed on file, and the recommendation with regard to the status of the committee was adopted.

The following resolutions, laid over from last year, were adopted:

Resolved, That in case of charges against any college no final action shall be taken until all parties concerned shall have at least thirty days' notice.

Resolved, That at all future meetings of the National Association of Dental Faculties the delegates shall consist of members of faculties, and demonstrators will not be received.

The following resolutions, also held over from last year, were laid on the table:

Resolved, That after June, 1893, the yearly course of study shall be not less than seven months, two months of which may be attendance upon clinical instruction in the infirmary of the school, now known as intermediate or infirmary courses.

Resolved, That after the session of 1892–93, four years in the study of dentistry be required before graduation.

The following resolutions lie over under the rules:

Offered by Dr. Winder,—

Resolved, That hereafter graduates of pharmacy be placed on the same footing as graduates of medicine, and be entitled to enter the second-year or junior class, subject to the examination requirements of each college.

Offered by the Executive Committee,—

Any college failing to have a representative present for two successive sessions without satisfactory explanation shall be dropped from the roll of membership of this Association.

The chair, having been asked for a ruling upon the admission of graduates of pharmacy to the junior class, decided that under the rules they could only be admitted to the first-year or freshman class.

The Executive Committee offered a report recommending the restoration of the American College of Dental Surgery to full membership, which, after an explanation by Dr. Marshall of the reorganization of the College, was unanimously adopted.

The Executive Committee reported on the application of the Western Dental College, of Kansas City, recommending that it lie over for another year. The report was adopted.

The report of the Executive Committee recommending the rejection of the application of the Tennessee Medical College, Dental Department, of Knoxville, Tennessee, for irregularities in conferring the degree of D. D. S. and in the reception of students, was adopted.

The application of Howard University, Dental Department, Washington, D. C., was laid over for another year.

The following applications for membership, also reported by the Executive Committee, lie over under the rules:

United States Dental College, Chicago.

Homœopathic Hospital College, Dental Department, Cleveland.

Detroit College of Medicine, Department of Dental Surgery.

The report of the Executive Committee recommending that the Baltimore College of Dental Surgery be censured by the Association for conferring the degree of Doctor of Dental Surgery upon Charles F. Forsham, M. A., LL. D., of Bradford England, *in absentia* and honorarily, in violation of the rules of the Association, was adopted.

Dr. Truman offered an amendment to the rule regarding the conferring of the degree of Doctor of Dental Surgery honorarily, absolutely prohibiting the exercise of that privilege to the members of the Association, but the amendment was lost, after discussion, it being the general sense that the present rule is a sufficient safeguard against the unworthy bestowal of the honor.

Dr. Cravens offered the following amendment to the constitution, which goes over under the rules:

Amend Article VII so that it shall read as follows:

ART. VII. Any reputable dental college, located in any State of the United States, may be represented in this body upon submitting to the Executive Committee satisfactory credentials, signing the constitution, conforming to the rules and regulations of this body, and paying such assessments as may be made.

The Association adopted a protest against the classification of dentists as manufacturers, as provided in the House Bill No. 7696, known as the Wilcox Bill, and against the collection of statistics from dentists under its provisions, on the ground that dentists are not manufacturers in any sense, not being engaged in the manufacture, fabrication, or sale of any product having a merchandisable value; that all the laws heretofore passed in the various States and Territories and the District of Columbia distinctly recognize dentists as professional men; and that the attempt to collect statistics would be an injustice not only to them but to their patients, and that such statistics, if collected, would be valueless to the government, because showing the product of a class of men not engaged in manufactures.

The following, offered by Dr. Winder, was also adopted:

Resolved, That the National Association of Dental Faculties recommend that their alumni write and demand of the Census Bureau of the United States the return of all statistical reports, as, under the recent agreement between the dental profession and said bureau, lawyers, physicians, and dentists are exempted from making statistical reports for the census of 1890; and that a copy of this resolution be forwarded to the chief of the Census Bureau.

A communication from the Post-Graduate Dental Association of the United States, suggesting the establishment by the colleges of short courses of training and teaching especially designed and arranged for practitioners, was received and referred to the Executive Committee.

The manuscript of a Compend of Materia Medica and Pharmacy for Dental Students, by Dr. E. L. Clifford, of Chicago, was referred to the committee on text books, with power to act.

Dr. Marshall offered the following resolution, which was adopted:

Resolved, That the secretary be instructed to notify the National Association of Dental Examiners that the National Association of Dental Faculties considers it out of its province to legislate upon the relative values of the L. D. S. and D. D. S. degrees.

The following were elected officers for the ensuing year: President, J. D. Patterson, Kansas City; Vice-President, H. A. Smith, Cincinnati; Secretary, J. E. Cravens, Indianapolis; Treasurer, H. A. Smith, Cincinnati.

Executive Committee.—F. Abbott, New York; J. Taft, Cincinnati; A. O. Hunt, Iowa City.

Ad Interim Committee.—James Truman, Philadelphia; Frank Abbott, New York; Thomas Fillebrown, Boston.

The President appointed as the *Committee on Schools.*—Drs. J. A. Follett, Boston; S. H. Guilford, Philadelphia; E. D. Swain, Chicago; C. N. Peirce. Philadelphia; T. W. Brophy, Chicago.

Adjourned to meet at the call of the Executive Committee.

LIST OF COMMITTEES OF WORLD'S COLUMBIAN DENTAL CONGRESS.

No. 11—Invitation.

Chairman—W. C. Barrett, 208 Franklin street, Buffalo, N. Y.; E. T. Darby, 1513 Walnut street, Philadelphia, Pa.; S. G. Perry, 46 West 37th street, New York City; W. C. Wardlaw, Augusta, Ga.; S.W. Dennis, 81 Flood building, San Francisco, Cal.; *Thos. H. Chandler, 161 Newbery street, Boston, Mass.; J. D. Patterson, Kansas City, Mo.

No. 12—Membership.

Chairman—Edmund Noyes, 65 Randolph street, Chicago, Ill.; B. F. Luckey, Patterson, N. J.; E. H. Chisholm, Tuscaloosa, Ala.; C. M. Bailey, 28 Syndicate Block, Minneapolis, Minn.; Daniel N. McQuillen, 1628 Chestnut street, Philadelphia, Pa.

No. 13—Education and Literary Exhibits.

Chairman—J. J. R. Patrick, Bellville, Ill.; J. Y. Crawford, Nashville, Tenn.; A. H. Fuller, 2602 Locust street, St. Louis, Mo.; C. A. Brackett, 102 Truro street, Newport, R. I.; B. H. Catching, Atlanta, Ga.

No. 14—Clinics in Operative Dentistry and Oral Surgery.

Chairman—C. F. W. Bodecker, 60 East 58th street, New York City; S. C. G. Watkins, Mont Clair, N. J.; John S. Marshall, 9 Jackson street, Arthur B. Freeman, 325 West Madison street, H. H. Schumann, 240 Wabash avenue, Chicago, Ill.; Henry W. Morgan, Nashville, Tenn.; William Crenshaw, Atlanta, Ga.

No. 15—Prosthetic Dentistry.

Chairman—S. H. Guilford, Philadelphia; L. P. Haskell, 211 Wabash avenue, Chicago, Ill.; A. P. Johnstone, Anderson, S. C.;

W. N. Morrison, St. Louis, Mo.; Fred C. Barlow, 646 Jersey avenue, Jersey City; J. Hall Lewis, 1309 F street, N. W., Washington, D. C.; A. O Hunt, Iowa City, Ia.; R. R. Freeman, Nashville, Tenn.; E. S. Gaylord, New Haven, Conn.

No. 16—Arrangements.

Chairman—E. S. Talbot, 125 State street, F. H. Gardiner, 126 State street, C. N. Johnson, Opera House Building, D. B. Freeman, 4000 Drexel Boulevard, Chicago; H. J. McKellops, 2630 Washington avenue, St. Louis, Mo.

No. 17—Essays.

Chairman—E. C. Kirk, Philadelphia; J. W. Wassall, Chicago, Ill.; A. H. Thompson, Topeka, Kan.; H. H. Johnson, 26 Second street, Macon, Ga.; L. G. Noel, Nashville, Tenn.

No. 18—History of Dentistry in the United States.

Chairman—J. Taft, Cincinnati, Ohio; Louis Jack, 1533 Locust street, Philadelphia; F. T. Van Wort, Brooklyn, N. Y.; F. J. S. Gorgas, Baltimore, Md.; H. L. McKellops, 632 Sutter street, San Francisco, Cal.; E. G. Beatty, Cincinnati, Ohio; J. B. Patrick, Charleston, S. C.

No. 19—On Nomenclature—Not Appointed.

No. 20—Appointment of Dental Surgeons in the Armies and Navies of the World.

Chairman—M. W. Foster, Baltimore; B. Holly Smith, Baltimore; George Cunningham, Cambridge, Eng.; De Gallippe, Paris; Adolph Weil, Munich; *J. B. Wilmott, Toronto, Canada; John E. Gievers, Amsterdam, Holland, E. De Trey, Vevey, Switzerland; A. Szigmondy, Vienna; O. Mela, Geneva, Italy; V. Haderup, Copenhagen; O. J. Crustchow, St. Petersburg, Russia; Alex. McG. Denham, Monjitas 68½, Chili; George B. Newland, 107 Calle Florida, Buenos Ayres.

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